RAILROAD GAZETTE

FRIDAY, JANUARY 23, 1903.

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Contributions

Magnetic Traction Increasers.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It is interesting to learn that go-ahead America is beginning to experiment with magnetic traction increasers. Sixty-four years ago Lieutenant Le Count, of the London & Birmingham Railway, wrote as follows: "The want of adhesion, so much talked of, is found to be only an excuse, or if there were any, it would only be necessary, as the writer of this article suggested several years ago, to connect a galvanized magnet with one or more of the axles to act on the rails, by which means, with the addition of only a few pounds, an adhesion equivalent to the weight of two tons would be produced at each axle, being capable also of acting or not at a moment's notice."

W. M. ACWORTH.

Determining the Size of Railroad Culverts.

Roanoke, Va., Dec. 29, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The writer has read with interest Mr. Whinery's article on culvert areas. Observations may be made on the velocity of rain water over an inclined area, and on the amount of rainfall in inches, but it seems to the writer that observations may as well be made directly at the culvert site, or at culverts similarly situated, to find the flow.

About 15 years ago the writer was called on for specifications to govern the location and construction of a piece of railroad. Among other items it seemed advisable to specify in some way the areas of the waterways to be provided. After going into the matter with some care the formula $a = d\,\frac{2}{3}$ was used, the locality being in the more or less rolling country east of the Alleghenies—"a" being the sectional area of the waterway in square feet, and "d" being the drainage area expressed in acres. Since then the writer, and some others, have made much use of this simple formula.

There may be, for instance, a drainage area of one acre. A rainfall of one-tenth inch per minute, continued indefinitely, would require a flow of 363 cu. ft. of water per minute to be taken care of. The two-thirds power of one is unity; so that a pipe of 1 sq. ft. area (or say 14 in. in diameter) would seem to suffice; the velocity of the water flowing through it, in order to pass the requisite volume, being 6 ft. per second.

The two-thirds power of 1,000 is 100. For 1,000 acres then, in a similar locality, the writer would suggest a 12 ft. span arch culvert.

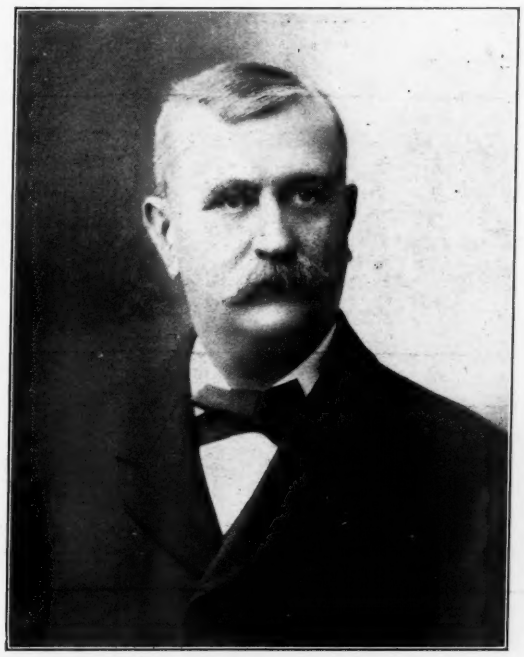
To go to extremes, the new Rockville bridge of the Pennsylvania Railroad may be cited. Here the drainage area is approximately 15,000,000 acres, the two-thirds power of which is 61,100. The area provided at that bridge is almost precisely 61,100 sq. ft. below the spring of the arches. Of course a formula like this, as well as the process of Mr. Whinery, has to be handled with care. In case of less rainfall, or if the ground be quite flat, the two-thirds power of the drainage area is too great for the square feet of area needed in the waterway. In the observation of the writer, 60 per cent. of the resulting area may be taken as the lower limit.

CHAS. C. WENTWORTH.

Alfred Noble, President American Society of Civil Engineers.

At the meeting of the American Society of Civil Engineers, held in New York this week, Mr. Alfred Noble was elected President. Within our recollection, no man who has been elected to this very honorable office has come so near to being the choice of the whole body of the Society. We have not heard one suggestion that some other man might better have been nominated this year, which is quite unprecedented in our experience. This is an extraordinary tribute to the character of the man, and it would have been impossible had it not been deserved, for no man reaches such a position in the estimate of the people who know most about him without deserving it. It is the general opinion that in professional attainments and judgment, and in weight of character, he stands in the first rank of American engineers.

Mr. Noble was born in 1844 in Livonia, Wayne County, Michigan, where his father was a farmer. In his youth he attended the country district schools and the village high school, and in August, 1862, at the age of 18, he enlisted in the Twenty-fourth Michigan Infantry. He served through the rest of the war, most of the time in the Army of the Potomac, and left the service with the rank of



Alfred Noble, C.E., LL.D.

sergeant. For two years he was a clerk in the War Department, and during that time he prepared himself for admission to the sophomore class of Michigan University, in the Civil Engineering course, and there he was graduated in 1870. He was absent much of the time during his course, working as recorder on the Survey of the Great Lakes and as clerk and assistant engineer on river and harbor works on the East side of Lake Michigan.

Shortly after graduating, Mr. Noble was put in local charge of the improvements of St. Mary's Falls Canal and St. Mary's River at the Sault Ste. Marie, where he remained until 1882. A good many engineers long ago recognized the fine work that Mr. Noble did at the Soo as a designing and executive engineer, but it is one of the drawbacks to service in the Engineering Bureau of the War Department that one's record is buried in official documents and only gets to be known outside by oral tradition. Nevertheless, during those years Mr. Noble was building up a substantial, even if somewhat narrow, reputation.

In August, 1882, he became Resident Engineer in the building of the Red River bridge at Shreveport, La., where he remained until March, 1883. Then he went to the Northern Pacific Railroad as General Assistant Engineer on the Washington bridge, New York City, name- River, Clark's Fork of the Columbia River, St. Louis Bay and the foundations and erection of the Marent Gulch viaduct. For about a year he was Resident Engineer on the Washington bridge, New York City; namely, to July, 1887. Then he was Resident Engineer on the building of the Cairo bridge, and from October, 1888, to May, 1892, was the Resident Engineer in charge of the building of the great bridge across the Mississippi River at Memphis, of which Mr. Morison was Chief Engineer. Later he was on the Bellefontaine and the Leavenworth bridges across the Missouri River and the Alton bridge across the Mississippi. These works (of which Mr. Morrison was Chief Engineer) occupied him until April, 1894, and during these two years he was in partnership with Mr. Morison.

He was a member of the Nicaragua Canal Board of 1895 and was appointed a member of the Isthmian Canal Commission in July, 1899, which Commission still exists. He was also a member for three years of the United States Board of Engineers on Deep Waterways.

Mr. Noble is now associated with Mr. Ralph Modjeski as joint chief engineers of the Thebes bridge over the Mississippi River now building, and he is also a member of the commission of engineers employed by the Pennsylvania Railroad to design and execute the great work of carrying the lines of that road across the two rivers and under Manhattan Island, and of building an immense station on Manhattan Island. Mr. Noble is not only a member of this commission but is Chief Engineer of the easterly section of that work, namely, the tunnel under the East River, which will probably be the most difficult part of the work.

In addition to the work named above, Mr. Noble has been consulting engineer in recent years on several important works and has done a considerable confidential service for the Government.

He is a member of the University Club and the Engineers' Club in New York, and of the Chicago Club in Chicago, of the Western Society of Engineers (of which he has been President) and of the Institution of Civil Engineers. In 1895 he received the honorary degree of LL.D. from Michigan University.

American Society of Civil Engineers.

The Fiftieth Annual Meeting of the American Society of Civil Engineers was held in New York City, beginning at 10 o'clock Wednesday morning, January 21. The following officers were elected:

President, Alfred Noble, New York.

Vice-Presidents, L. F. G. Bouscaren, Cincinnati, and James D. Schuyler, Los Angeles, Cal.

Treasurer, Joseph M. Knap, New York.

Directors, Alfred Craven, Yonkers, N. Y.; Joseph O. Osgood, Plainfield, N. J.; George S. Davison, Pittsburgh; E. C. Lewis, Nashville; Hunter McDonald, Nashville; Elwood Mead, Cheyenne.

The medal and prize were awarded by the Board of Directors to the following papers:

The Norman Medal to Paper No. 911, "Experiments at Detroit, Michigan, on the Effect of Curvature Upon the Flow of Water in Pipes," by Gardner S. Williams, M. Am. Soc. C. E., Clarence W. Hubbell, Assoc. M. Am. Soc. C. E., and George H. Fenkell, Jun. Am. Soc. C. E.

The Thomas Fitch Rowland Prize to Paper No. 910, "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government," by William W. Harts, M. Am. Soc. C. E.

The report of the Board of Management shows a total membership in all classes of 2,713. The net increase during the year was 185.

The accessions to the library during the year included 1,116 bound volumes, 2,968 unbound volumes and 3,095 specifications. The library now contains 11,330 bound volumes and 27,609 unbound volumes. A second volume of the classified catalogue is now nearly all in type and it will be issued to the members in about a month.

For the year ending with July, 1901, the Rowland prize was awarded to Mr. Montony, for a paper on "The Power Station of the Metropolitan Street Railroad." The prize for Juniors was awarded to Mr. Kummer, for a paper on "Timber Preservation." Both of these awards were announced at the time of the last annual meeting. The awards for the year ending July, 1902, are mentioned above.

In four years $30,000 has been paid on the mortgaged debt of the Society, leaving that debt now only $55,000. The Society is in fine financial condition, with no debts and over $26,000 cash in bank. The special committee on uniform tests of cement made a progress report covering considerable ground. The essentials of this will be published in a later issue.

The proposition was brought forward to amend the Constitution so as to put the election of members in the Board of Direction. This was defeated and the proposed amendment, as it has been sent to the members, now goes to letter ballot. The object of this amendment is simply to permit the Board to classify applicants.

A resolution of respect to the memory of Mr. Abram S. Hewitt was introduced by Mr. George S. Morison and seconded by Captain Robert W. Hunt. This resolution, which was unanimously passed by a rising vote, is as follows:

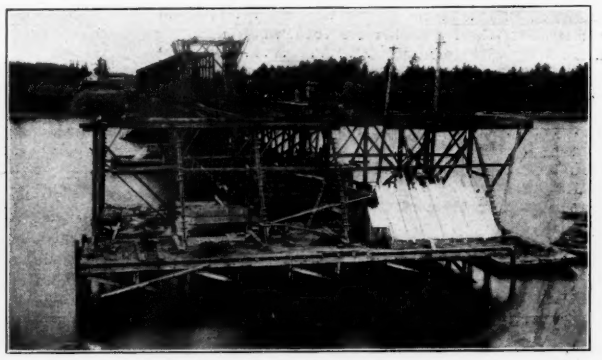
Resolved, That the members of the American Society of Civil Engineers assembled in their annual meeting at the hour when the last sacred rites were performed over the mortal remains of Abram S. Hewitt, desire to place on record a brief recognition of the debt which so many of them individually and all of them as a profession, owe to him who was for so many years New York's first citizen. While he always disclaimed being an engineer he had the mind and spirit which mean more than the actual professional name. While not enrolled among their members his whole life, as a citizen, a manufacturer and an educator was devoted to those interests which have made the engineering profession possible. Few cities had so patriotic a citizen; no profession has had a warmer friend.

Erection of the Northwest Miramichi Bridge, Newcastle, N. B.

BY H. D. BUSH, *M. Am. Soc. C. E., M. Can. Soc. C. E.*

The broad tidal river, the Miramichi, is formed about one mile above Newcastle, New Brunswick, by the junction of two branches called respectively the Northwest and Southwest Miramichi. The head of navigation for ocean-going craft is about two miles farther up each branch, where both are crossed by wooden highway bridges, and just above these are the single-track bridges of the Intercolonial Railway. The latter are structures of some interest historically and were built from about 1870 to 1874, the engineer being (Sir) Sanford Fleming, M. Am. Soc. C. E.; the contractors for the substructure, Brown, Brooks & Ryan, and for the superstructure, Clarke, Reeves & Co.

Caisson Used in Building Piers.
(From an old print.)



Erection of the Old Miramichi Bridge.
(From an old print.)

The piers are of native sandstone with granite-faced cutwaters, and are being used without alteration to support new and heavy superstructures. The foundations were made by sinking open double-walled caissons for the southwest bridge, the material being dredged out through wells until a suitable bearing on a thick stratum of gravel was reached and the caisson then filled with concrete. At the northwest bridge rectangular cribs were used with two rows of sheet piling driven inside and the enclosed space dredged out and filled with alternate layers of concrete and rubble stone. One pier settled 10 in. during construction, but under a test weight, greater than that it had to carry, and left on several months, it settled only 2½ in. more. Investigation showed the settlement to have been wholly within the caisson and not due to compression of the gravel foundation.

The floor system of the old Phœnix spans was strengthened in 1888 by the addition to each floor beam of two 2¼ in. square truss rods and by the replacing of the original floor beam hangers by new ones 2 in. in diameter. A heavy lower lateral system was, at the same time, added.

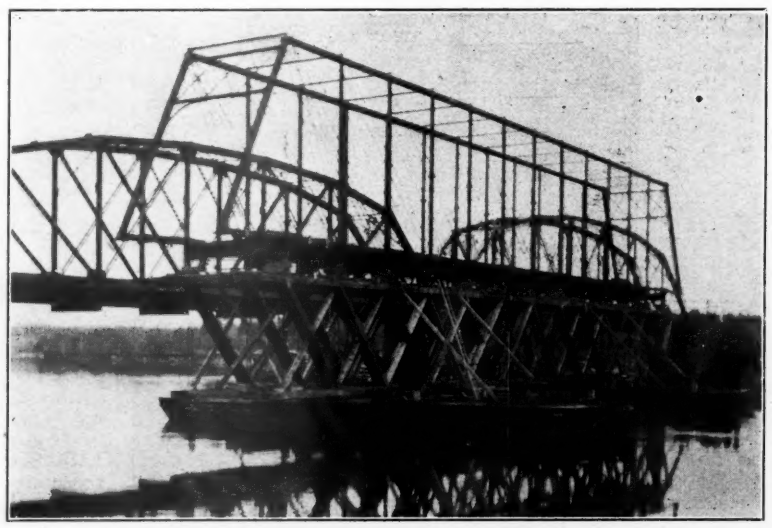
The old spans so far taken down show a remarkable state of preservation. The insides of the columns, apparently coated by dipping in something like a pipe compound, are entirely free of scaly rust and show only slight discolorations from rust after 30 years of use. It would be of interest to know just what this compound was. The pin nuts have unscrewed more easily than expected, and the pins show practically no signs of wear. The old spans have each 14 panels of 14 ft. 7 in., making them 204 ft. 2 in. long between end pin centers. The floor-beams are 24 in. deep with flange angles 4 in. x 4 in. x ½ in. The two lines of stringers are 16 in. deep with 3 in. x 3 in. x ⅜ in. flange angles and rested on a small shelf angle and were each connected to the floor-beam webs with 6—⅝ in. bolts. There were wooden cross-bearing beams under the ends of the old stringers on all the piers and abutments, the pockets in the masonry being about 30 in. deep.

The new spans are heavy riveted trusses each with seven panels 29 ft. 4 in. long. The suspended floor-beams are 72½ in. deep and are riveted between the lower ends of the vertical web members which are extended through the lower chords. There are four lines of stringers 48½ in. deep spaced 3 ft. center to center. In the end stringers the bottom flange angles are brought up in a reverse curve to reduce the depth at their outer ends to 33¾ in. to fit the pockets in the masonry.

The new bridges are designed in accordance with the Intercolonial Railway specifications of 1901, the uniform live loads per lineal foot for the several parts being as follows:

Trusses	5,900 lbs.
Floor-beams	6,750 lbs.
Main stringers	9,100 "
Connections of main stringers and floor-beams	10,600 "

It was suggested in these specifications that the old spans be removed bodily by means of scows with trestle work thereon and taking advantage of the rise and fall of the tide. The spans were to be rolled back on trestle work built on the south shore below the bridge so as to be in a position for sliding down to the deck of a barge for transportation elsewhere.



Floating Out Old Phoenix Span—Miramichi Bridge.

The method of erection of the new trusses and removal of the old ones as outlined in the specifications was adopted by the Dominion Bridge Co., L't'd, contractors for the new bridges. The original idea of transporting each old span entire, on a special scow, to Charlottetown, Prince Edward Island, where the spans are to be used in a bridge carrying a roadway for teams and a narrow gage railroad has been abandoned, and they are being taken apart, using an outside square traveler running on the ground, at the shore ends of the landing trestles. The center lines of these trestles are 204 ft. 2 in. apart and, in the Northwest river, there was barely room for them between the railroad and highway bridges.

Four scows were built for this work, each 84 ft. x 26 ft. and 8 ft. deep. There are five longitudinal Howe trusses 7 ft. 6 in. deep in each scow, spaced 5 ft. 3 in. center to center. Two scows were used for each truss, both old and new. As the old trusses required a support at each panel point, a Howe truss bridge was built crossing over two scows and projected three panel lengths at each end, the scows being spaced four panel lengths apart. The chords of these trusses were 12 in. x 24 in., made up of 3 in. x 12 in. planed planks bolted together to make a net section equal to about 10 in. x 18 in. for a calculated maximum chord stress of 136,000 lbs.

On account of the truss rods projecting below the floor-beams of the old spans, blocking was hung at each end of each floor-beam, so that the lower surface of the blocking was just below the metal work. These blocks were always in place before a span was lifted. As the work in 1902 was done at a season of comparatively low water, additional blocking, varying from 8 in. to 21 in. depth, was used on various spans. Pieces of 8 in. x 12 in. and 5 in. x 12 in. were always kept on the top chords of the Howe trusses at panel points so that this additional blocking could be quickly adjusted.

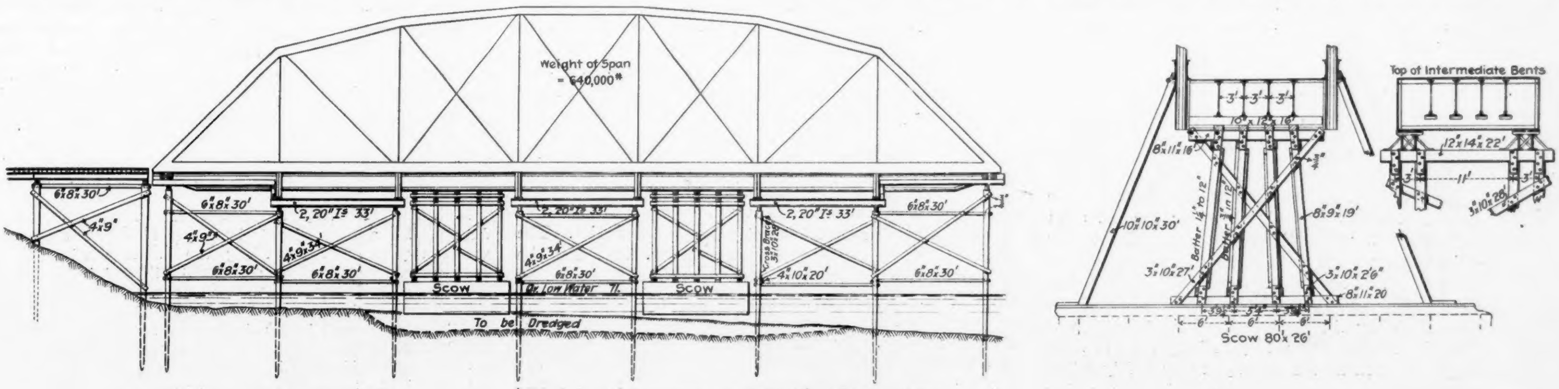
The details of the Howe trusses suspended blocking, etc., used in connection with lifting the old spans, is shown herewith. Each of the scows carried a 6 in. centrifugal pump with connected engine, the two engines being run from one boiler. Each scow also had a 6 in. gate valve placed on one side close to the bottom and controlled from the deck. Water could be let into these scows at the rate of slightly over one foot an hour and pumped out of both simultaneously at the rate of ½ in. a minute. Each scow used under the new spans had two 6 in. gate valves and two diaphragm pumps. These scows were generally placed under the spans with about 8 in. of water in them, this being pumped out by hand and the balance of the lifting done by the tide.

The new trusses were erected on twin falseworks placed side by side, each one just long enough for one span and situated on the south shore just far enough up stream to allow the 84 ft. scows to pass between

Floating In New Span.
(End Stringers shown lashed up.)

Erecting New Truss.

the falsework and the bridge pier. There were two openings through which the scows could be passed; these openings dividing each falsework into three towers, one of one panel and two of two panels each. Short trestles connected the falsework with the top of the river bank and the tracks from the unloading derricks.

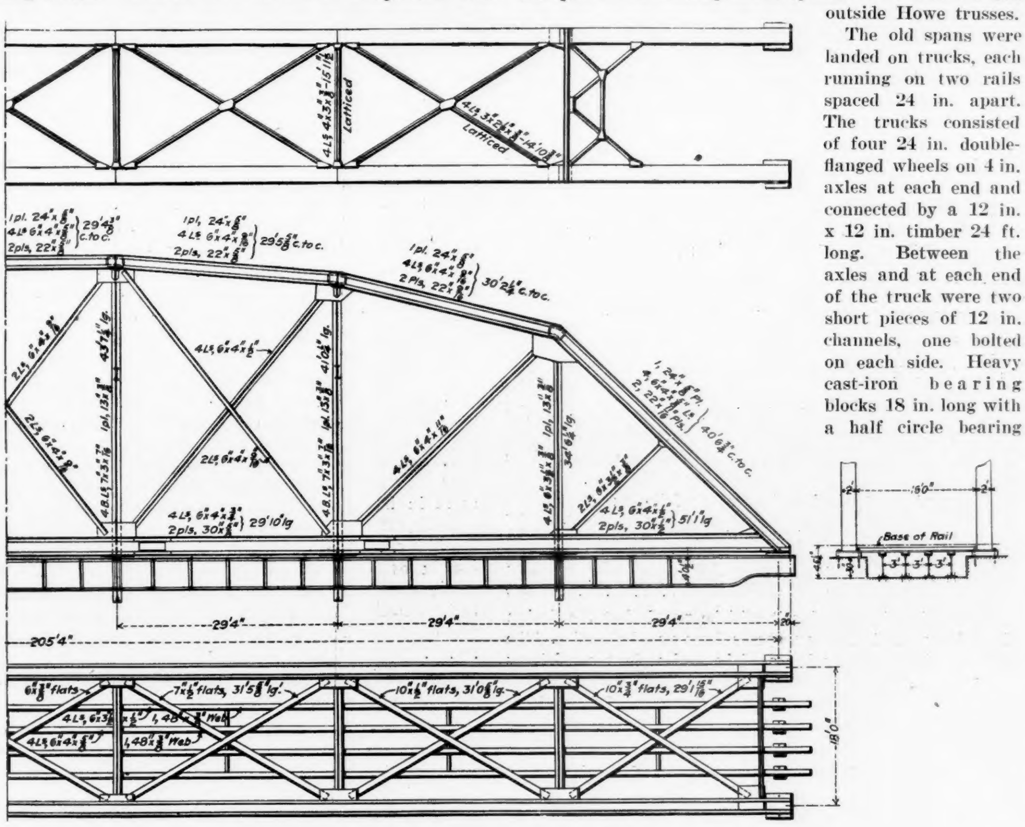


Falsework for Erecting New Spans.

The spans were erected by a two-boom traveling derrick running on two rails spaced 10 ft. center to center. The working platform was about 10 ft. above the rails and so supported as to leave room for a standard-gage track beneath it. As soon as one span was erected the traveler was pulled over on greased rails to the second falsework and a second span erected while the first was being riveted. One 10 in. x 10 in. air compressor with two upright boilers furnished power for the riveters. Fresh water was taken from a "spring" (covered at high tide) found at the base of the south abutment. The flow of water was said by the old inhabitants to come from a bore hole sunk by the engineers 30 years before, to determine the character of the abutment foundation.

On each of the scows used for floating the new spans five trestle bents were erected with four legs in each bent, giving a total of 40 posts each 8 in. x 9 in. to carry the load of 640,000 lbs. The trestles were 20 ft. 7 in. in height and well braced in four directions. The legs in each bent were spaced 3 ft. centers on top and battered, as shown, to bring the loads down to the scow at the points calculated to receive them.

The new spans were supported on the trestles from the four track stringers in the two panels next the center panel. On account of the narrow base—9 ft.—afforded by the stringers, six side braces on each scow, were used, and extended from the lower chords of the span to the bearing blocks spiked over the center and outside Howe trusses.



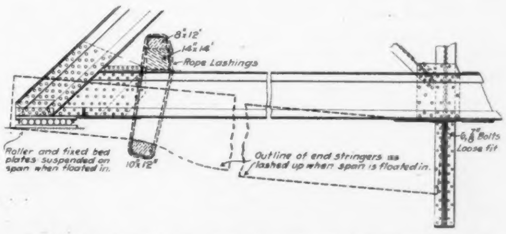
Erection Diagram of New Spans.

The old spans were landed on trucks, each running on two rails spaced 24 in. apart. The trucks consisted of four 24 in. double-flanged wheels on 4 in. axles at each end and connected by a 12 in. x 12 in. timber 24 ft. long. Between the axles and at each end of the truck were two short pieces of 12 in. channels, one bolted on each side. Heavy cast-iron bearing blocks 18 in. long with a half circle bearing over each axle extended across from out to out of channels. The wheels revolved on the axles.

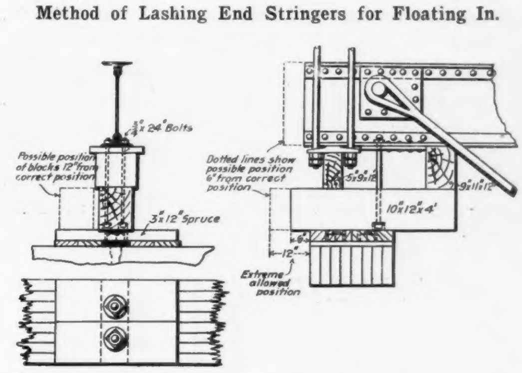
The bed plates of the old spans rested on heavy cross timbers 6 ft. long, placed on the trucks between the axles, the latter being 3 ft. 8 in. center to center. When a span had been rolled back to its correct position on the landing trestles, ship jacks were placed underneath the trucks between the rails, and the trucks then lifted a few inches. Blocking was then built up from the caps of the trestle bents to the projecting ends of the cross-timbers; the jacks were next released, and the trucks rolled forward ready for the next span. On account of the concentrated loading the bents of the landing trestles were spaced only 8 ft. apart—the two lines of stringers under each rail being made up of two pieces of 12 in. x 12 in. on top of each other. All the square timber in these trestles was native hemlock.

After starting work it was found that the information previously obtained concerning the tides was inaccurate. A fairly regular rise from low to high tide of nearly 4 ft. had been counted on. As soon as gages were established the records showed the average rise to be considerably less than 3 ft.

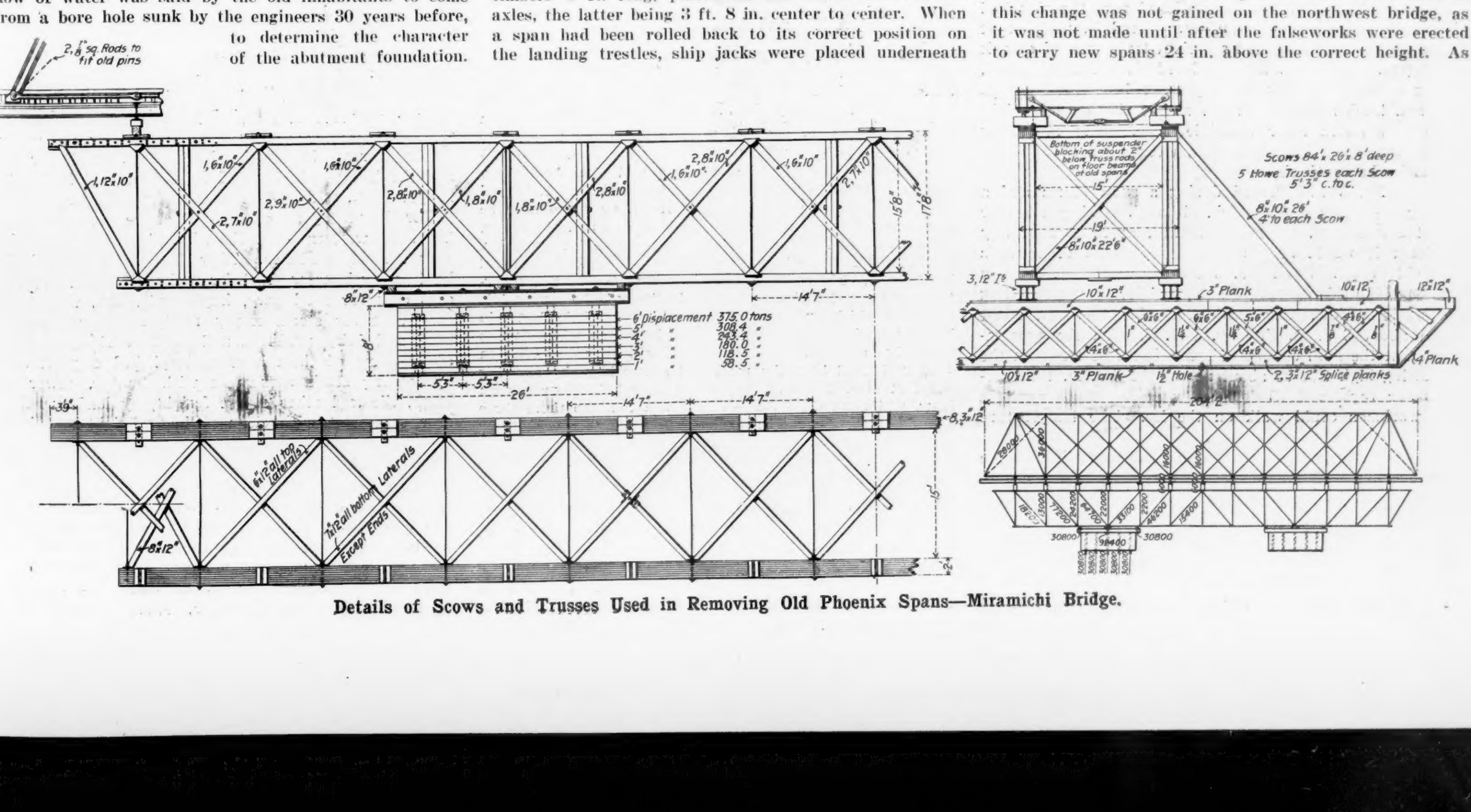
As the end stringers hung down 30 in. below the bed plates of the new span, it would have been necessary, with them in correct position, to float the span 30 in. plus 10 in. or 12 in. for clearance, above its correct height. It was, therefore, decided not to rivet these stringers until the spans were in place. They were accordingly tilted up with their bottom flanges, at their outer ends, on a level with the bottom of the foundation bed plates, which was done by lashing them to a 14 in. x. 14 in. cross-timber resting on the bottom chords of the truss and close to the end gusset plates. The full benefit of this change was not gained on the northwest bridge, as it was not made until after the falseworks were erected to carry new spans 24 in. above the correct height. As



Method of Lashing End Stringers for Floating In.



Detail of Blocking Under Old Spans.



Details of Scows and Trusses Used in Removing Old Phoenix Spans—Miramichi Bridge.

soon, therefore, as a new span was afloat, it was at least 24 in. above the correct height, thus giving plenty of time to land it even on a falling tide. Nevertheless time was saved by having a less distance to lower than originally contemplated.

The scows drew 4 ft. loaded, thus leaving 4 ft. freeboard so that it was safe to lower them 30 in. by admitting water, still leaving decks 18 in. clear, but it would have been safer and quicker to have been able to reverse these figures by having falseworks 1 ft. lower than those built. There were two cross-bulkheads in each scow to prevent the water in them from rushing to one end in case of tilting by the wind.

For the placing of each span a day was selected when there promised to be a suitable tide, coming at a time of day to least disturb railroad traffic. At low tide the Howe truss with scows was placed under the old span and the other scows under the new span. If the tide seemed to be coming up to expectations and if no strong wind started, the track was cut about two hours before high tide and the end panels of the floor system of the old span removed. In the meantime sufficient water was let into the Howe truss scows to just keep the old span from lifting. As soon as the new span was safely afloat the centrifugal pumps were started, and after a few minutes pumping the old span could be pulled to one side and the new span brought into position.

The new span was held by two cross-tackles at each end, as well as by anchor lines on the scows. As soon as the new span was safely in position the end stringers were lowered to their correct level, and, as soon as the tide had turned, the valves in the scows were opened and the span lowered. There was a delay of several hours in placing the second span due to an unusually high tide which lifted this span over 5 ft. above its correct height. There was also a delay on the fourth span when the tide lifted the span over 3 ft. above its correct height, a strong up-stream wind holding the tide for two hours.

It was necessary on the northwest bridge to wait for a fairly high tide for lifting the new spans, on account of the very shallow water around the falsework; in fact, a pocket was dredged to get the inshore scow low enough to go under the span. On the southwest bridge, with comparatively deep water close to shore, it will be easy to supplement an insufficient tide by first admitting some water into the scows, before they are blocked under the span, and pumping it out again as the tide rises.

Span No. 1 of the northwest bridge was floated on Thursday, Oct. 9, and pulled about 100 ft. out into deep water. This span the railroad officials positively refused to have placed until Sunday on the ground that, until at least one change had been made, there was no way to tell exactly how long it would take, and that they could not afford to have the road open for an indefinite time except on Sunday. The contractors took the risk of holding this span afloat for three days and nights in order to get the use of the falsework to begin the erection of another span. There were very strong down-stream winds during this time, half a gale on Friday, Oct. 10, when it was wished that the risk had not been taken. This span was placed in position at noon Sunday, Oct. 12, and a freight train crossed over it at 4 p.m. Span No. 2 was placed on the north shore, being towed across the river, just at dusk Sunday, Oct. 19, and landed about 9 p. m., as the tide on this night rose two hours after schedule time. The remaining spans were placed in succession, working from the north towards the south shore.

Span No. 3 was floated during a snow storm and a strong up-stream wind, which, although making it harder for the two tugs, made it certain that in case of any accident it would blow away from instead of towards the old bridge. Span No. 6 was finished Dec. 3 when the day high tide came at 9 a.m., and for three succeeding days was too low. The scows were placed under the last span about 3 a. m. Sunday, Dec. 7, with the expectation that the final change of spans could be made on the following high tide at about noon. At 5 a. m. the thermometer registered 18 deg. below zero, and by daylight the workmen could walk on the ice. The temperature remained so low during the following week that it was found impossible to cut a large enough opening in the ice to enable the span to be floated and pulled out into deep water. It was therefore decided, on Saturday, Dec. 13, to leave the last span on the falsework until next spring, when the contractors would have a force of men on the ground for work on the southwest bridge.

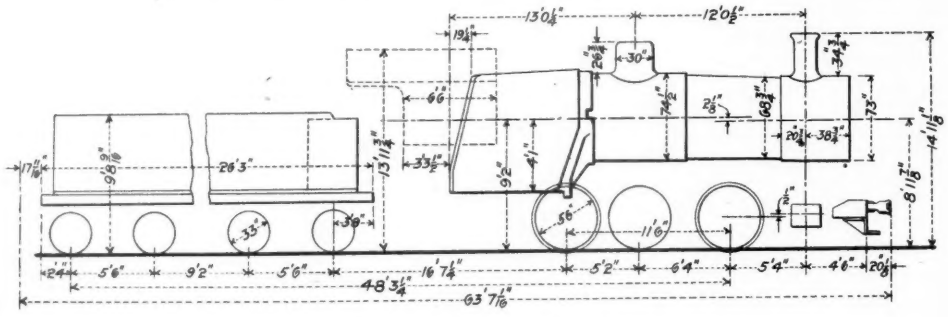
As the first span was floated Oct. 9 and the sixth span ready on Dec. 3, the rate of progress for five spans was about nine days per span, there having been 44 working days included between these dates. It was impossible to get men to work over four machine riveters, although the air compressing plant would have run six. With two more gangs of riveters and a few extra erectors one span a week could have been completed. There are about 10,000 field rivets in each span.

The calculations and plans for the erection work were made under the general direction of Mr. Phelps Johnson, C. E., Manager of the Dominion Bridge Co., L't'd, by the writer of this article, who also had charge of the work.

Class B6 Six-Wheel Switcher For the Pennsylvania Lines West of Pittsburgh.

The engine which we illustrate herewith is the heaviest six-wheel switcher that has yet come to our notice. The total weight in working order is 170,000 lbs., and the light weight is 150,700 lbs., all of which is, of course, on the drivers. If the weight were equally distributed, the rail pressure becomes 28,333 lbs., a value higher than is usually allowed. In our issue of Sept. 19, 1902, page 728, we described a six-wheel switcher weighing 130,700 lbs. for the Lake Shore, and at that time we commented upon the unusual weight.

This new switcher was built at the Altoona shops for the Pennsylvania Lines West of Pittsburgh. The engine has not yet been adopted as a standard by the Pennsylvania. The cylinders are 22 x 24 in. and the total heating surface is 2,495 sq. ft. The boiler contains 325 2-in. tubes, 13 ft. 10¼ in. long, and is 74½ in. in diameter at the largest ring. The grate area is 41.2 sq. ft. and the steam pressure is 205 lbs. Assuming that 85 per cent. of the boiler pressure of 205 lbs. is available at starting, the maximum tractive effort is 36,200 lbs. The drivers are 56 in. in diameter, and the middle pair are blind. The total cylinder volume on one side is 10.5 cu. ft.



Six-Wheel Switcher—Class B6.

(Built at the Juniata Shops of the Pennsylvania.)

Some of the typical ratios are as follows:

Weight on drivers divided by maximum tractive effort	4.7
Weight on drivers divided by heating surface	68.1
Heating surface divided by grate area	60.6
Tube surface divided by fire-box heating surface	16.4
Heating surface divided by cylinder volume	238
Grate area divided by cylinder volume	3.9

From the above ratios it will be noted that the design is a departure in many respects from usual practice. The relation between heating surface and weight on drivers is not much greater than that for many old passenger engines, and is a fair value for modern freight locomotives. The grate is also unusually large for switching service, and the ratio of 4.7 between weight on drivers and maximum tractive effort reduces the possibility of slipping drivers.

Complaints have frequently been made against the noise and smoke from switching engines, and considerable time and effort has been spent in studying this problem and devising means for reforming the locomotive of its inherently bad habits. Liberal proportions, as above noted, should do much in this direction.

A Railroad Automobile Service.

On June 18 next, at 8:50 a. m., there will start from the Lyons station in Paris a train composed of three "autonomobile" carriages—that is to say, carriages that are both autonomous and motor-cars—which will enter the Dijon station at noon. There the 120 travelers carried by the three automobile wagons will be entertained at luncheon. The 315 kilometers between Paris and Dijon will thus have been covered in three hours and ten minutes, or at a normal speed of 100 kilometers per hour; and the same speed may be maintained between Dijon and Lyons, Lyons and Marseilles, Marseilles and Nice, and Calais and Paris uninterruptedly, so that the distance between Calais and Nice can be covered in 14 hours. The eminent firm of Gardner & Serpollet undertakes the construction and organization of the automobile carriages which on June 18 next will make their first trip between Paris and Dijon. That firm is the one which in two successive competitions for the Rothschild Cup at Nice in 1901 and 1902 beat the record of automobiles by covering the first time 101 and the second time 121 kilometers an hour, while the third time—for to win the Cup there three records of speed must be made—it proposes to cover 140 or 150 kilometers an hour. Messrs. Gardner & Serpollet are now constructing the automobile carriages whose public appearance will entirely transform, probably in all parts of the world, the mode of conveying passengers. At present, indeed, it will be applied only to the conveyance of passengers for the simple reason that it requires a special type of carriage, the construction of which demands both time and capital. The new carriage is 17 meters long—that is to say, the length of the present corridor carriage. Of these 17 meters a space of 2.6 meters in front is occupied by the traction apparatus, while the remaining 14.4 meters will comfortably accommodate 40 passengers and the 1,200 kilogrammes of luggage allowed them, besides a lavatory and a handy little bar, where passengers during the journey may always find refreshment.

The cost of the automobile is the same as that of the first-class corridor carriage, while the weight, including the traction apparatus, is also the same. Thus the abolition of the locomotive is an accomplished fact, and the rails which now have to bear the weight of the locomotive and tender as well as of the carriages are relieved therefrom. It will easily be understood that M. Noblemaire, the manager of the P.L.M. Company, the greatest authority the Continent possesses on railroad traction, after listening to MM. Gardner and Serpollet, exclaimed: "It is an absolute revolution, and on the day when your automobiles are ready I shall be ready also to place at their disposal the rails of the P.L.M. for their first trip."

In front of every automobile is an apparatus producing with a litre of petroleum per kilometer the steam power requisite for propelling the carriage with its 40 passengers, lavatory, bar, and 1,200 kilos of luggage at a normal speed of 100 kilometers an hour. In order to overcome the air resistance which such a speed entails, the automobile in front and behind is so shaped as to cut the air, which thus becomes an auxiliary rather than an obstacle. As each automobile has its own apparatus, the carriages, of course, might go singly as easily as when coupled together.—*London Times.*

Average Lading of Freight Cars and Tons Lading of Freight Trains.*

. . . Trainmasters, chief despatchers and yard masters can see that engines are given their full rating, but they cannot control the tons loading of freight cars. Hence the importance of continually watching the matter and of having all agents guard against the forwarding of unnecessarily light-loaded cars. The greater average tons per car means a greater average of paying tons per freight train, consequently a corresponding reduction in the cost per ton of freight moved. Every freight agent should be informed of this important factor and should enforce, so far as his power will control, the loading of freight cars to as near the marked capacity of the car as the character of the freight handled will admit; 50,000, 60,000 and 80,000 lbs. capacity cars should not be furnished for hay, flour, oats, rags, junk, lumber and other commodities upon which a miminum of from 19 to 30 thousand lbs. would apply, for in every case there would be an additional dead weight of from three to eight tons per car by reason of the greater tare weight of the high capacity cars.

A very great saving can be accomplished in the handling of less than carload shipments of company material, small stores and supplies. The general practice, at the present time, seems to be to load a car at the company storehouse with such freight for the various divisions and branches, and then forward it to be distributed over the various divisions. This results in a great many cases in hauling lightly loaded cars long distances and delaying such stores and supplies from reaching their destination, often necessitating tracing by wire. This can be overcome by loading such material, small stores and supplies, in a car at the storehouse, to go to the freight house for transfer. It is then transferred into regular merchandise cars for the various divisions. . . .

Another very important factor is the greater average lading per car of package freight from terminals. It has been demonstrated that an average of 15,000 lbs. per car can be maintained from the larger terminals, and 11,000 lbs. per car from smaller terminals and division stations. In my judgment it is perfectly safe to establish a minimum of 8,000 lbs. from the smaller terminals and division stations on this class of freight. In cases where there are not over 5,000 lbs. car lading for any certain district, if the character of the freight will admit the car should not be forwarded but the freight should be held over until the following day. To illustrate what can be done by a systematic effort along these lines, I submit herewith a comparative statement of less than carload shipments of package freight handled at one division freight house for the months of October, 1901 and 1902:

	Cars loaded.	Cars unloaded.	Total cars.	Tons freight handled.
October, 1901	1,427	1,139	2,566	13,745
October, 1902	925	997	1,922	16,881

The decrease in cars handled is 944, or 25 per cent., and the increase in tons of freight handled is 3,136, or 23 per cent., with no increase in freight house pay roll.

For the past year, on account of the crop shortage of 1901, the western trunk lines have been confronted by a very serious condition. They have been compelled to haul empty box cars east for package freight, empty flat cars east for machinery, implements, etc., empty stock cars west for stock, empty refrigerator cars west for meat and dairy products, and empty coal cars west for coal. Some of them have accomplished a great saving by loading stock cars west with lumber, sewer pipe, brick, tile and other coarse freight, by loading refrigerator cars west with clean package freight and loading coal cars into coal districts with lumber, posts, machinery, bridge material, etc., thereby saving the haul of empty box cars east. A greater saving can be effected by filling up with clean package freight regular refrigerator line cars scheduled to pick up less than carload lots of perishable freight at the junction or

*Abstract of a paper presented to the Western Railway Club, January, 1903, by Mr. J. H. McPartland, Asst. Superintendent C., B. & Q., Burlington, Iowa.

division point where the car closes, that is, where it can be done without unnecessary delay. Freight liable to damage by dampness, such as musical instruments, matches, plated stoves, etc., or freight from which the odor would taint the perishable shipments, should not be loaded in such cars. When freight is loaded in refrigerator cars with game, poultry, fish, oysters or fresh meats packed in ice, packages should be loaded on grain doors or strips of wood to avoid damage from floor water. By following this plan the earnings of such cars can be increased 30 to 40 per cent.

Conductors of way freight trains can accomplish a great saving along these lines by exercising good judgment in the loading and unloading of cars in their trains. For instance, where there are three cars used as pick up or way freight cars, two cars might serve the purpose of three, as follows: One car for freight destined beyond the division of the train run of the way freight on main line, and one car for freight destined to division point and connections. A conductor making such runs daily is better able than any one else to determine how to accomplish these results. Division superintendents and trainmasters can accomplish much in the economical handling of way freights, in particular, by taking up these matters from time to time with conductors of such trains. Also, the matter of all freight conductors taking their tonnage of empties from the marked tare of the car instead of the estimated weight and the net as shown by the waybill. Agent's billing usually shows the tare, net and gross tons. The tare, as a rule, is estimated by the billing clerk according to the class of car, for the reason that he has no way of ascertaining the actual light weight. I am of the opinion that it will not work any hardship on any one to insist on the consignor giving the marked tare of the car together with the car number and initial on the shipping bill. In billing cars, when the marked tare cannot be obtained, I think the bill should show the net weight only. The gross weight should be added by yardmasters, yard clerks or the first conductor handling the car, thus enabling yard men and conductors to get actual tonnage of all trains. I have checked a great many trains, and in every case I have found that the conductor's tonnage exceeded the actual tonnage in the train. In the last check of a train of 62 cars, 35 loads and 27 empties, the actual gross tons were 1,505, while the conductor's report showed gross tons 1,611, or 106 tons over the actual tonnage of the train.

In 1891 the average net tons per car of western roads was about 12. In 1902 the average is about 16 tons. This increase in tons is not in proportion to the increase in the carrying capacity of our equipment, and therefore should receive systematic treatment at once. By a thorough and united effort along these lines, I feel quite safe in saying, that the net tons per car can be increased with our present equipment to an average of from 20 to 25 net tons per car. As to the tons loading of freight trains, railroad officials for several years have given special attention to tonnage rating of engines, and in many cases, in their efforts to load engines to their maximum capacity, allowed their zeal to carry them too far.

. . .

It is not so much the tons hauled by one engine in one train, as the tons hauled by one engine in one week or one month. It is far more economical in a heavy business to give engines a slightly lighter loading, which enables them to get over the road at a good average speed to division points where the engines can be promptly turned and got out with another train. This results in an increased engine tons mileage in a given time, decreased fuel consumption and expense in maintenance of engines and repairs on equipment, a greater contentment among trainmen and enginemen and a considerable decrease in the amount of delayed time paid.

The Hibbard Valve for Braking Empty and Loaded Cars.

At the last Master Car Builders' Convention, in a brief report submitted by Mr. G. W. Rhodes, Chairman of the Committee on Triple Valve Tests, reference was made to the necessity for having an air-brake that can be adapted to loaded as well as empty cars. Since the braking power on cars is based on 70 per cent. of their light weight, for loaded cars of to-day this represents only about 20 per cent. of their weight. In the discussion it was brought out that a device for increasing the braking power on loaded cars was in use on the Burlington & Missouri River in Nebraska, though very little information was to be had regarding the nature of the device, or what results it was giving in service, as it had then been in use only a very short time. But a number of these valves have now been in continuous service for a considerable period and the results have been so encouraging that we are now able to present a description of the device.

It consists of two parts—a valve and a supplemental reservoir, and its application requires but slight alteration in the brake gear and none in the piping. It is operated by the "bleed" rods, and is capable of performing three separate functions; one being to produce a partial braking pressure on an empty car; the second, to provide full braking pressure for a loaded car; the third, to bleed or release the auxiliary reservoir. It is so arranged that when thrown into the loaded-car position the valve will automatically continue in that state so long as the brake system is charged, unless restored by the trainmen to the empty-car position; and should the pressure in the brake system be released, the valve will automatically resume the empty car position. It will be seen that this latter feature provides against a car, which has been set out of a train loaded and the load having been removed, being picked up empty with the device still operative for load; for were this to happen, skidded wheels would result.

A relative arrangement of the apparatus with reference to the other brake equipment on the car is shown in Fig. 1. It will be seen that pipe connection is made from the valve to the auxiliary reservoir and to the brake cylinder on one side, and to the supplemental reservoir on the other. Connection to the auxiliary reservoir is made through the bleed opening, and connection to the brake cylinder may be made through an oil hole

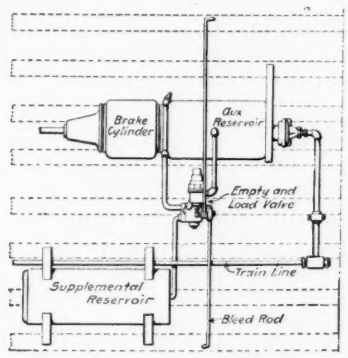


Fig. 1.—Car Connections of Hibbard Empty and Load Device.

by removing the plug. This saves making additional holes for these connections.

Fig. 2 shows a section through the operating-valve chamber of the device. Within this chamber is a rotary valve, the stem of which passes through the valve casing at the right-hand side and has on its outer end the handle to which the bleed rods are attached. A collar on the stem within the valve chamber bears against a gasket, forming an air-tight joint. The valve stem is detachable, its inner end, which is rectangular in form, fitting between two lugs on the valve.

The valve seat and valve are shown in Fig. 3, both being made of brass. The latter has a circular port passing transversely through it, and also contains two recesses as shown. The seat has four circular ports. One of these latter ports leads to the brake cylinder and

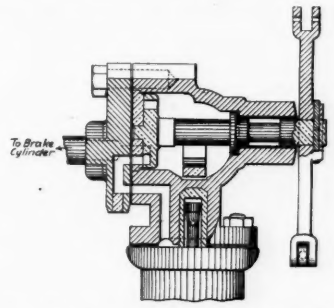


Fig. 2.—Rotary Valve and Chamber.

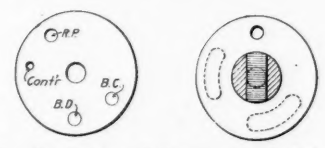


Fig. 3.—Rotary Valve Seat and Valve.

is marked "B. C."; another leads to the pressure regulator, or blow-down, and is marked "B. D."; a third is the release port, being marked "R. P."; and the fourth is for the "controller," so-called. The pipe from the auxiliary reservoir leads into the rotary valve chamber, giving the reservoir pressure above the valve at all times.

This connection is shown in Fig. 4, which also shows a section through the rotary valve chamber at right angles to the plane of the section of Fig. 2; and sectional views of the automatic valve-locking and controlling device, and of the pressure-regulating or blow-down device. The latter, which is encased in an extension bolted to the bottom of the valve casing, is designed to keep the brake-cylinder pressure at a predetermined minimum during a service application, and to reduce it to this same minimum after an emergency application; with the result that as the speed of the train decreases the pressure decreases, and skidded wheels are thereby prevented. In the upper part of the regulator is a tube or closed bushing which is penetrated by two exhaust ports, one from each side as shown. The bottom of the bushing forms a seat against which presses a piston head, closing connection between the small chamber above the piston and the exhaust passages. Pressure against the piston is maintained by the spiral spring below, adjustment of the pressure being obtained through the adjustable follower-plate at the bottom of the spring. Projecting upward into the bushing and forming part of the piston is a stem having its upper end of gradually increasing diameter, which is the provision for regulating the exhaust ports; for it will be seen that this will give a slow initial release, which gradually increases as the pressure diminishes. This regulator may therefore be used with a high-speed brake as well as with the usual system. The chamber above the piston is in communication through a passage (Fig. 2) with the blow-down port in the valve seat, referred to above.

The automatic valve-locking and controlling device, and the valve governing the supply of the supplemental reservoir form the upper left-hand part of Fig. 4. They are moved by the lug on the rotary-valve stem, which engages a slot in the stem of the controller. The latter also has upon it a helical spring placed between two followers mounted loosely upon the stem. A passage leads from the spring chamber around through the casing to connection with the port marked "Contr." in the rotary-valve seat.

In its normal state the mechanism stands at the empty-car position, which is the position shown in the drawings. The recess near the lower edge of the rotary valve connects the brake-cylinder and blow-down ports, and all other ports are lapped. In this position the braking is done by the auxiliary reservoir only. Admitting the air from the brake cylinder through the blow-down port to the chamber above the piston in the regulator moves the piston to open the exhaust ports when a predetermined pressure has been obtained in the brake cylinder. In service action this prevents the pressure in the brake cylinder exceeding this predetermined amount.

In an emergency application, the sudden admission of a higher pressure to the brake cylinder causes the regulator piston to be depressed a greater distance, which will bring the larger part of the stem over the exhaust ports, retarding the initial reduction. As the pressure diminishes the reduction increases, which reduction has been proportioned to the speed of the train. When the pressure has diminished to the predetermined amount, the exhaust ports are closed and that pressure maintained in the brake cylinder until the brakes are released. The regulator is designed to serve equally well with the ordinary automatic, or the high-speed brake, it being understood that it is intended only for empty cars.

The automatic controller has no part in that function of the device just described. To make the device operative for a loaded car the trainman pushes on the bleed rod, which rotates the handle and rotary valve toward the right, or clockwise. This destroys the connection between the brake cylinder and pressure regulator, and by means of the recess at the left side of the rotary valve establishes connection between the ports "Contr." and "R.P." in the valve seat. This gives atmospheric pressure in the spring chamber of the controller. The lug on the rotary-valve stem forces the controller stem to the left against the pressure of the helical spring, at the same time causing the disk, or collar forming an

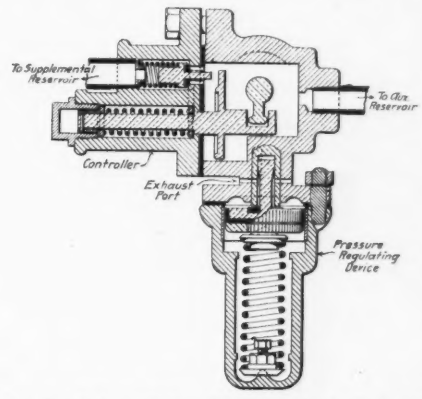


Fig. 4.—Rotary Valve Chamber, Controller and Regulator.

integral part with the controller stem to seat against the gasket placed between the two parts of the casing. The valve governing the supplemental reservoir is opened by this same movement, giving the combined volumes of the two reservoirs for braking and thereby increasing the power. Since the rotary valve and the disk valve of the controller both have reservoir pressure above, or back of them, they are held in the loaded-car position so long as the brake system is under pressure. When this pressure ceases from any cause the spring on the controller stem operates to restore the device to empty-car position. It will, therefore, be seen that the loaded-car position is dependent upon air pressure in the brake system.

The third function which the device is adapted to perform—that of "bleeding" the auxiliary reservoir—is performed in the usual manner so far as the rods are concerned; that is, the trainman pulls on the rod. This rotates the handle and rotary valve toward the left, bringing the port of the rotary valve in register with port "R.P." in the seat and closing all other ports. This bleeds the auxiliary reservoir, leaving the supplemental reservoir unaffected. This action forces the stem of the controller to the right against the pressure of the spring, which latter operates to restore the parts to normal position the moment the trainman releases the bleed rod.

The predetermined pressure which the regulator or blow-down is set to maintain is 35 lbs. This, of course, necessitates arranging the brake leverage to give the required force against the wheels still to produce 70 per

cent. of the light weight of the car. Since the device will maintain in the brake cylinder a constant minimum pressure of 35 lbs., it will be seen that piston travel may be disregarded so far as brake-cylinder pressure is concerned.

For loaded-car braking the combined volumes of the two reservoirs will give 60 lbs. in the brake cylinder for service application and about 68 lbs. for emergency. In the operation of the brakes in a train of mixed cars of empties and loads, a 5-lb. reduction in the train line will produce from 12 to 15 lbs. pressure in the brake cylinder where the auxiliary reservoir is used alone, and from 25 to 30 lbs. where the two reservoirs are used. Further reduction maintains the same relation between the empty and loaded cars, so that when the former have reached 35 lbs. in the brake cylinders the latter will have reached 60 lbs.

In practice, a card is pasted on the side of the car just over the bleed rod, which card reads as follows:

To Brake for Load—When the train is made up and the air pumped up, push the release rod in to its full travel.

To Bleed—Pull the release rod as usual. When the car is unloaded in the train, being set for loaded braking, pull the release rod to bleed; this will bring to the empty position. When the air leaks off, the parts will automatically assume empty braking position.

A number of these devices were placed on cars of the Burlington & Missouri River last April and additional cars have been equipped from time to time. The part of this line in the region of the Black Hills afforded excellent opportunity for practical tests of the device, grades between Edgemont and Deadwood being as high as 4 per cent. Trains of 12 or 14 cars of 60,000 to 80,000 lbs. capacity are the limit on this branch, and it is said that if such a train have in it three or four cars equipped with this device the engineman can control it upon the grades without difficulty, whereas ordinarily "clubbing" must invariably be resorted to. During the nine months that the device has been in service on this road there has not been a case of flat wheels under the cars so equipped. The Chicago & Alton is having 300 cars, which are building at the Standard Steel Car Co., equipped with these valves.

The device is the invention of Mr. M. W. Hibbard, of Chicago, known as the inventor of the Hibbard triple valve. It is owned and is now being made by Mr. R. Fitzgerald, Vice-President and General Superintendent of the Chicago Junction Railway.

Bridge Across the Missouri River at East Omaha, Nebraska.

This structure crosses the Missouri River between the City of Council Bluffs, Iowa, and East Omaha, Neb. Nearly 10 years ago the old bridge was completed, consisting of one 520 ft. draw span, three 192 ft. fixed spans, and about 550 ft. of timber trestle. The 520 ft. draw span was designed to carry a double track railroad inside the trusses, and electric cars, highway and pedestrian traffic on cantilevered roadways outside the trusses.

The three fixed spans are of temporary construction, and these and the timber trestle approaches were designed to carry only a single track railroad loading, but the entire roadway was floored so as to provide for highway traffic.

All of the piers for the existing structure, excepting the pivot pier, were constructed of piling. The pivot pier was sunk to bed rock, about 120 ft. below low water, by open dredging. Although three of these pile piers are in the channel of the river, they have withstood the high waters for the past nine or ten years, and are at present in very good condition. At times very great scour has occurred around piers Nos. 3 and 4, and they have been forced down stream a few inches, but by riprapping around them, and bracing the piling below water with adjustable chains, this movement was stopped before reaching any serious amount.

When the existing structure was completed, it was the intention to rebuild the temporary portion of the work within seven or eight years, but the structure proved more durable than expected, so the rebuilding was postponed.

In order to facilitate the erection of the permanent structure, the old structure was erected on a line making an angle of 10 deg. 53 min. with the final bridge tangent as shown on general plan, the center of the pivot pier of the existing draw span forming the common point of the two structures, or the axis of rotation. The new structure can be erected clear of the old work, and traffic maintained on the old structure until the new spans are completed, when by revolving the old span the traffic will be diverted to the permanent structure.

The new superstructure will consist of a 520 ft. draw span and nine 60 ft. plate girder approach spans. The new substructure, beginning on the Iowa side of the river, will consist of the following: Abutment A, concrete resting on the sand; pier No. 1, masonry shaft, concrete base, pile foundations; pier No. 3, masonry shaft, pneumatic caisson, to land in the sand at a depth of about 84 ft. below low water; pier No. 4, pivot pier, masonry shaft, double steel shell, filled with concrete, sunk to bed rock by open dredging, depth of bed rock below low water 120 ft.; pier No. 5, masonry shaft, pneumatic caisson, to land in the sand at a depth of 74 ft. below low water; piers Nos. 6 to 12, concrete shafts and bases, pile foundations; abutment B, concrete shaft and base, pile foundations.

The following are the approximate quantities in the substructure: Mass in cribs and caissons of pneumatic piers, 4,180 cu. yds.; mass in base of new pivot pier, 5,390 cu. yds.; mass in bases of pile piers and abutments, 2,330 cu. yds.; masonry in shafts of four large piers, 2,135 cu. yds.; concrete in shafts of shore piers and abutments, 1,550 cu. yds.; piling below bases of concrete piers and abutments, 19,900 lin. ft.; metal in new pivot pier, 580,000 lbs.

The shafts of all river piers are to be built of concrete and faced with Kettle River sandstone. The shafts for all the small piers and for the two abutments are to be of concrete throughout.

The copings of the concrete piers will be formed of granitoid, mixed in the following proportions: Portland cement, one part; clean coarse granite sand, two parts; granite chips to pass ½ in. ring, three parts.

The concrete for shafts and bases of piers where not deposited in the water will be mixed in the following proportions: Portland cement, one part; clean coarse sand, three parts; broken limestone to pass 2½ in. ring, five parts.

In the bases of the piers sunk by open dredging, will be deposited enough of the concrete through the water to seal the bottoms of the cribs. For all concrete so deposited the following proportions will be used: Portland cement, one part; clean sharp sand, two parts; broken stone to pass ¾ in. ring, three parts.

The new pivot pier is almost an exact duplicate of the old pivot pier. The inside cylinder forming the dredging well is 20 ft. in diameter, and the outside cylinder is 40 ft. in diameter. At the bottom, the inside cylinder is flared to connect with the outside cylinder, thus forming a cutting edge. The two cylinders are well braced together, and the annular space between them is to be filled with concrete as the sinking progresses. The metal for the inside cylinder is ⅜ in. thick, and that for the outside cylinder ½ in.

No difficulty was encountered in sinking the old pivot pier, there being ample weight to settle it, as the material inside was removed by the dredges. Provision has been made for using a number of water jets around the cutting edges, should this be required for sinking.

The new superstructure has been designed to carry two railroad tracks between the trusses and highways, and motor tracks, and sidewalks outside the trusses or girders. The old draw was designed to carry the same traffic, but the live loads used for the new structure are very much heavier than those used for the old, as will be seen from the following comparison:

	Old span.	New span.
Live load for railroad stringers, lbs. per ft. per track	5,180	8,450
Live load for railroad floor beams, lbs. per ft. per track	4,150	6,320
Live load for trusses, lbs. per lineal ft. of bridge	9,000	11,180
Dead load for trusses, lbs. per lineal ft. of bridge	6,100	9,020

The total weight of metal in the old span is 2,768,000 lbs., while that for the new span will be 3,900,000 lbs. The weight of metal in the nine approach girders will be 1,773,000 lbs. These weights do not include the metal outside of the trusses or girders, as the cantilevers will not be put on at present.

The draw spans will be operated by motors installed in duplicate. The time for raising the ends and turning the spans through one-fourth of a revolution under ordinary conditions will be about two and one-half minutes. The machinery houses will be fireproof with steel frame work, concrete floors, and walls of Portland cement plaster on expanded metal lath.

The superstructure metal will be of medium steel, subpunched and reamed. All gears, tracks, rollers, rack and pedestals will be of cast steel. All high speed gearing will have cut teeth.

The principal points in which the design for the new draw span differs from that of the old draw span designed ten years ago are as follows:

(1) In the new draw the live loads are very much greater, consequently the span is much heavier.

(2) All lateral and sway bracing is much more rigid in the new span than in the old.

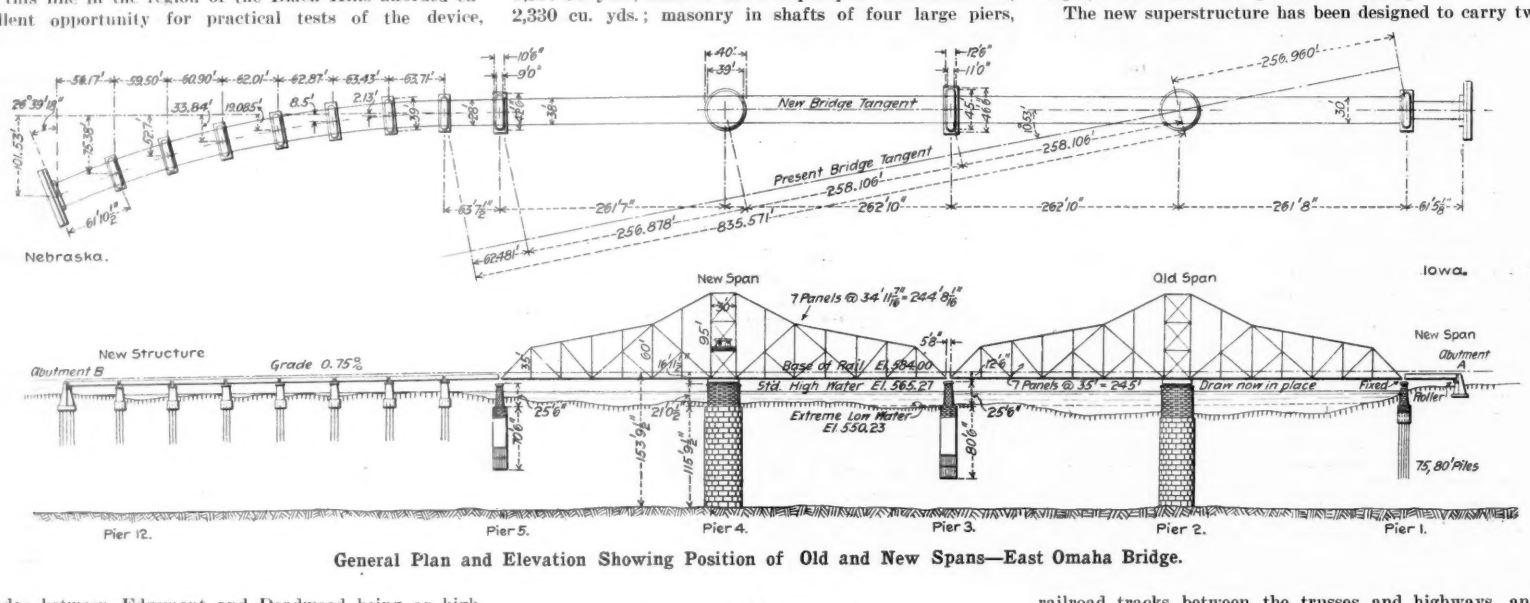
(3) All castings in the new draw span are cast steel while in the old span they were made of cast iron.

(4) The new draw span has a double webbed drum and two circles of rollers, while the old span has a single webbed drum and one circle of rollers. The loading of the drum by means of ball and socket bearings is also a new feature.

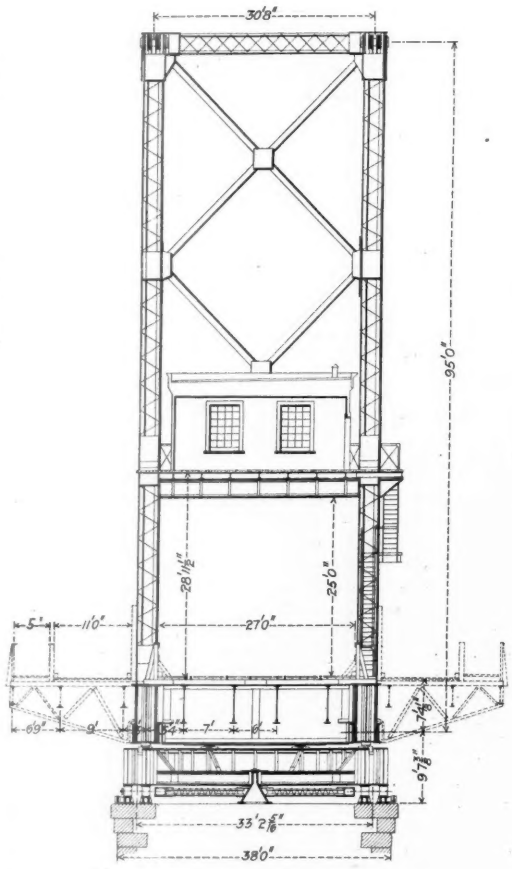
(5) The ends of the new draw will be raised by means of wedges, while toggles are used for the old span.

(6) The lower tracks for the new draw are of a much stronger and more rigid form of construction than that used in the old draw span.

When the structure is completed the entire channel of the river will be spanned by the two draw spans. The additional draw span was put in instead of the 560 ft. fixed span originally intended, for two reasons:



General Plan and Elevation Showing Position of Old and New Spans—East Omaha Bridge.



Section at Center of New Draw Span.

(1) On account of the constantly changing channel of the river.

(2) The cost of the additional draw and the substructure for the entire bridge on this basis was considerably less than for the structure with the fixed span.

As the structure is now designed the channel must move outside the present banks to get from under the two draw spans.

The total cost of the entire new work will be about $600,000. The substructure work is being done by the Foundation & Contracting Co. of New York. Mr. Geo. Adgate has direct charge of the work. Work was begun on Oct. 22, 1902, and the contract time for completion is June 1, 1903.

The superstructure will be made by the American Bridge Co. The contract time for the completion of the superstructure is Nov. 1, 1903.

Waddell & Hedrick, Consulting Engineers, Kansas City, Mo., have designed and are superintending the work.

A Modern Car Shop.*

The accompanying drawings are the proposed shops of the Armour Car Lines, to be built at the Union Stock Yards, Chicago, to take the place of the present shops. The new shops will have a capacity of four new refrigerator cars per day, in addition to the rebuilding and repair work, and, I believe, are situated so as to obtain the best results, considering the site.

A reference to the engravings will show the various shops contemplated and their location. The erecting and heavy repair shop is 225 x 220 ft., containing 12 tracks with 18-ft. centers, each track holding five cars when set for repairs, the total capacity of this building 60 cars. These cars are handled into and out of the shop by means of an electric transfer table. Attention is called to the fact that only two tracks (except narrow-gage material tracks) connect with this transfer table, the one at the extreme east end being the feeder track, or track on which the bad order cars are accumulated and enter the shop; and the track west of the center of the transfer pit being the outlet track.

The blacksmith and machine shop is 50 x 150 ft., with full equipment of machines and tools. At the north end of this building is the wheel platform, the wheels being unloaded and loaded on cars from the depressed track, bringing the level of the car floor to the level of the platform. This building is located 82 ft. north of the main repair shop, the material being handled over the transfer table, except that which is handled through the store department.

The wood mill is 50 x 150 ft. This building is also located 82 ft. north of the main repair shop, the supplies being handled over a narrow-gage track and the electric table.

The store-room, with the office attached on the south end, is as near the center of the plant as possible. Material received and forwarded at the storehouse in carload lots is switched on the depressed track at the east side of the building, the level of the car floor being the level of the store room floor; and materials handled by team being received and delivered at the north end of the building at the elevated platform, this platform being the height of a wagon body. From this store room or central location, the material is handled to the several points of the yard by means of the narrow-gage system already referred to.

The boiler house, fan rooms and dry kiln is one brick building, 30 x 75 ft. The scrap bins, 20 x 50 ft., are open on both sides, for the purpose of delivering the scrap to the bins from the west side and loading it from the bins on the east side on cars set on the depressed track, where the car floor will be level with the floor of the scrap bins. This also provides a building 20 x 50 ft., for a repair shop for handling second-hand material, and is equipped with shears, bolt and nut machines and small hammer, all second-hand material being worked over at the scrap bins and delivered direct to the yard, where it will be used again.

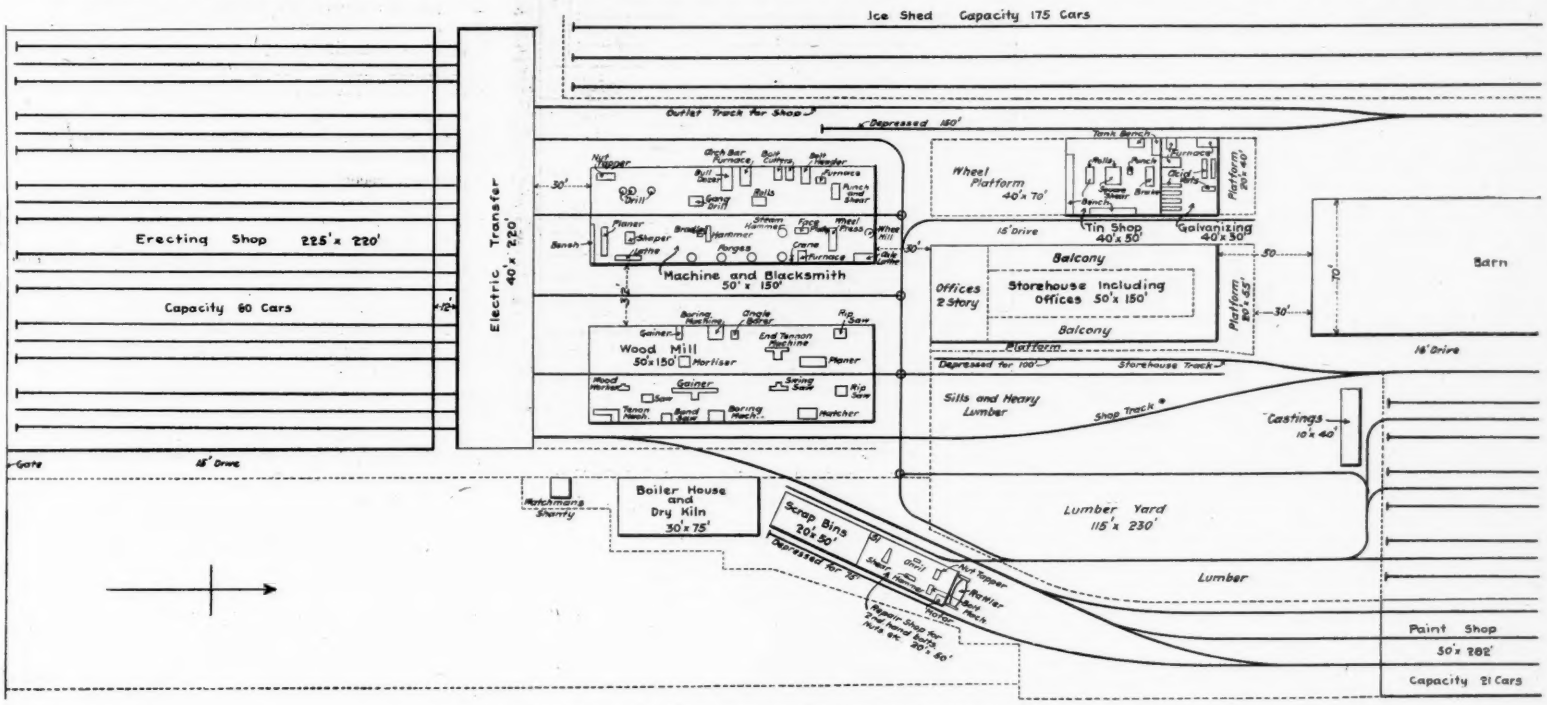
The paint shop, 50 x 275 ft., has a capacity of 21 cars, the cars being handled from the erecting shop to this paint shop by means of an electric motor, the track being a 4 per cent. down grade, starting at a distance of 150 ft. north from the transfer table.

The oil and paint house is located at the extreme north end of the yard, or as far away as possible from all other buildings. In this are handled all the mixed paints, oils and other inflammable materials.

The casting shed, where materials are stored for use in light repair, is located as near as possible where light repairs are made.

The plan of operation is to have all cars going to the shop stopped opposite the boiler room and storehouse, where all of the old material of the bodies of the cars will be stripped off. The wood material will be deposited in the boiler room to be burned up, and the forgings and castings delivered at the scrap bins. All the materials to be used on the repairs to each car will be loaded into the car before it is passed over the transfer table into the repair shops, and while it is located conveniently to the shop, mill and storehouse.

Tracks for the light repair yard are provided for west of the paint shop. These tracks are laid at 18-ft. centers. The capacity of this yard is 75 cars, when set for repairs. These shops will be operated on a piece-work basis.



General Layout of the Proposed Shops of the Armour Car Lines—Chicago.

*Abstract of a paper presented to the Western Railway Club Jan. 20, 1903, by W. E. Sharp, Superintendent Armour Car Lines, Chicago.

Locomotive Inspection in Contract Shops.*

The subject of inspection of engines under construction is one which is of vital importance to both the builders and the railroad companies, and this being the case too great care cannot be exercised in the selection of men to fill these positions, both as representatives of the railroads and representatives of the builders. In the best building shops the inspection of work under construction is generally organized under the head of a general inspector with a number of assistants, who take up the detail of inspection in the various departments. In addition to this, of course, the foremen and assistant foremen are also inspectors.

The key to the situation of a building shop is the general inspector, and this man should be one who appreciates both the railroad's and the builder's position; he should be one who is thoroughly conversant with the engine in all of its details and be a mechanic of the very highest grade, who will, on account of his ability, have the confidence of the mechanics in the shop and of the railroad inspectors who may be assigned to the plant, and his decision should be absolutely final so far as the builders are concerned; in other words, there should not be an appeal by foremen over his head. He should, however, keep in constant communication with the general superintendent or manager of the plant, and in case of any critical matters, should, before making a decision, take up the matter with the manager or the general superintendent for discussion; but the decision, so far as the shops are concerned, should be made by him, so that the foremen, assistant foremen, mechanics and others should feel that he was the final tribunal on all matters of workmanship.

In some of the long established shops where the men are thoroughly trained there will be little need of inspection, for the men themselves will take sufficient pride in their work to turn out work of good quality, but in the majority of cases, where the contract or piece work system is adopted, there is great danger of men slighting quality to get out quantity. It is, therefore, better to have too many inspectors than not enough.

The assistant inspectors should be furnished with proper report blanks, on which should be shown the nature of the defect, the workman's name, the contractor's name, the foreman's name and what action has been taken. Frequently the work is not entirely condemned, but may have to be sent back to the machines for proper finish, but all such cases, whether they can be corrected or not by the workmen, should be reported to the general inspector, and the report should state the action taken. If the defects are of such nature, however, that the parts have to be condemned and new parts gotten out, it should be the inspector's duty, as a rule, to so mar or damage the parts that they would not be possible of use, and he should promptly notify the foreman so that they may be replaced at once to avoid delay. From the individual reports of the assistant inspectors, the general inspector should have made up daily a statement to the general superintendent giving a report in full of all defects found during the day, and this statement should also show what action has been taken.

It very frequently happens that the trouble is not altogether with the workmen, but is partially, if not altogether, due to the condition of the machinery, or possibly imperfect drawings or prints, and if such is the case, of course the machine should be put in proper condition at once, or the drawings corrected. It again happens that the workman has not been properly instructed by his foreman. If this is the case, it should be looked into and seen that proper instructions are issued. At the end of each month the daily reports should be divided, first to the various departments, second to the various contractors, and last to the individual workmen themselves, and in this way the department foremen who are careless will be detected and can be checked up, and they in turn can check up the contractors and workmen.

The inspectors and the foremen are practically partners in the same business, that of producing first-class work, and if the foremen find out that their advancement, either in position or salary, depends upon the quality of their workmanship first and quantity second, they will soon appreciate the assistance which a good inspector can give them, for he should be nothing more than an additional pair of eyes for a good foreman. The same relationship which exists between the assistant inspectors and assistant foremen should exist between the general inspector and superintendent and the general foreman.

The discipline of the various workmen should be in the hands of the general foreman and his assistants, and not in the hands of the inspectors. The ideal condition which the general inspector should strive to obtain for his force would be such careful and thorough inspection as to make it entirely unnecessary for the railroads to require inspectors at all. In other words, the shop inspector should discover defects in advance of the railroad inspector. The same qualities which make a good general inspector should obtain so far as assistant inspectors are concerned, that is, they should be competent

*Abstract of a paper presented to the Richmond Railroad Club, Dec. 11, 1902, by Mr. H. A. Gillis.

mechanics, fearless, unprejudiced and absolutely truthful.

Too many railroads make the mistake of sending young and incompetent mechanics, or young technical graduates of little or no experience with the idea of giving them shop knowledge and training them in the practices of building shops. This, I believe, is a serious mistake, and usually a very expensive one, both for the railroad companies and the builders, and it has been my experience in the five years in which I have been connected with a building shop that such men cause a great deal of friction, much trouble and serious delays. If they are to be sent to the shops at all, they should be sent there as assistants to well trained men, and not in charge of the inspection. The greatest trouble with these men is that, in consequence of their lack of knowledge, they are usually extremely suspicious, and endeavor to make up by their positiveness and assertion of authority for this lack.

It frequently happens that in consequence of lack of authority of the resident inspector and the necessity of having to refer matters back to the railroad for adjustment the engines are so badly delayed that it becomes necessary for the builders, in order to keep their plant operating to run in other engines ahead. This, of course, not only causes delay to the railroad company, but is the cause of much dissatisfaction and loss both to the railroad and builders. Another great cause of trouble is the fact that the railroad inspectors frequently come to the building shop with the idea that every one, from the General Manager down to the rivet boy, have entered into a conspiracy to work against him and to turn out as poor work as possible. Railroad inspectors who come to the shops with such an idea as this soon make themselves thoroughly unpopular with every workman in the shop.

Another frequent source of trouble is the fact that the methods of doing work in the building shops are usually entirely different from those in the railroad shops, and the railroad inspector frequently believes that the methods of doing work as used in the shop in which he was educated or brought up are the only right ones, and desires not only to inspect the finished product, but to instruct the foremen and workmen as to the methods of doing the work. In many cases the inspector comes from a day work shop, and he may be a strong opponent of contract or piece work, and come with his mind already made up as to the quality of the work he is going to obtain. It would seem wise for the inspectors to be instructed before starting out that such matters are of no concern to them.

Railroad inspectors are entitled to respect, politeness and consideration in the shop from all employees and foremen, and should insist upon it; but on the other hand, foremen and employees in the shop are also entitled to respect and consideration on the part of inspectors, and if this mutual consideration is shown much trouble can be avoided; and the management of every building shop should insist upon this, and I believe that where an inspector is known to obtain the ill-will of the men in the shops that the railroad company should recall him, and send another man. It is also true that not only in the case of locomotive inspection, but in that of inspection of cars, engines or other equipment, that railroads who have obtained a reputation of having supercritical inspection pay a great deal more for their equipment than railroads who have practical, common-sense inspection.

Low Pressure Pneumatic Signaling at Salisbury, England.

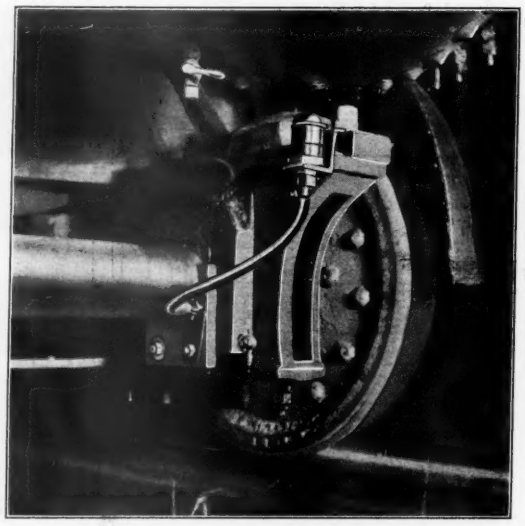
The above plant, on the London & South Western, which is the first large low-pressure installation in England, was put into service on Sunday, November 2. At each end of the station there is situated a cabin known respectively as the east and west boxes. These two cabins and a ground frame do all the work which formerly was done by four mechanical machines, thus saving the services of six signalmen. The ground frame is only used during the time that shunting is going on at that point, and has been rendered necessary, not on account of the distance from the east cabin, as these switches could easily be operated from there, but to meet the requirements of the Board of Trade, which demands that a man must be on the ground to attend switching operations carried out at such a distance, i.e., about 1,200 ft. from the cabin. The interlocking between the east box and the ground frame is carried out as follows: When shunting is to be done a man is sent to the ground frame, all the levers of which he finds locked in the normal position. He asks cabin No. 2 for an "unlock," which is given by pulling over the lock lever provided for the purpose and which, on being reversed, frees the king lever in the ground frame and locks up all conflicting signals and points in the east cabin. On obtaining this release the signalman at the ground frame is able to operate any of his points or signals, and when the shunting is finished and his king lever has been replaced by him to its normal position, then, and not till then, can the signalman in the east box replace his lock lever, get his indication and free his signals and switches controlled by it.

The west cabin contains a 64 lever frame of the usual type made by the British Pneumatic Railway Signal Co. Twenty-two of these levers work 30 signals, 19 are for switches and five for bolt locks between the Great Western and the west box; in addition to these there are two special lock levers controlling signals operated from the east cabin similar to those for the east box and ground frame; and 16 spare spaces. The east cabin also contains a 64 lever frame, 27 of which work 32 signals, 17 are for switches, three special lock levers and 17 spare spaces.

The compressed air for working the whole of the switches and signals is obtained from one power house situated near the east cabin. There are provided here two compressors, each more than sufficient to do the work of the whole station; and one is kept as a stand-by while the other is working. A further precaution is taken by having two separate powers to drive the compressors, one compressor being driven by an electric motor run from the mains of the Electric Company at Salisbury, the other by steam from a boiler in the boiler-house adjoining. The air is compressed to 30 lbs. per sq. in. and conducted through a galvanized pipe to a receiver of 250 c.f. capacity. From thence, having been reduced in pressure to 20 lbs., to two more receivers of the same capacity situated one at each cabin, and from these latter receivers, to the cabins, switches and signals, by means of galvanized pipes. The main pipe is 2 in. in diam. and the various branches run from 1 in. down to ¼ in. diam.

A novelty, so far as English practice is concerned, is that all the levers operating the running signals are replaced in the normal position electro-pneumatically by a valve actuated by the relay of the track circuit, with which all the running lines of the station are provided.

In several cases in this station one lever will operate one of two signals, which one depending on the position of the switch leading to the track for which these signals give permission to run on. The method of doing this is as follows: The indicator selector valve which is placed at the switches and worked by the motion plate is similar to the ordinary switch indicator valve with the exception that it is provided with extra ports. In one position of the motion plate the low pressure operating pipe A is connected, by means of these extra ports, with the low pressure pipe operating the diaphragm for signal No. 1; but when the points are moved over, the pipe A will be connected to the low pressure pipe operating diaphragm for signal No. 2.



The Brush System of Journal Lubrication.

A New System of Journal Lubrication.

Patents on a system designed to supply continuous lubrication to locomotive and car journals, and which is expected to effect great economy in the consumption of oil have recently been granted, illustrations of the device being shown herewith. It is known as the Brush system from its distinguishing feature, a brush being so employed as to act as the lubricator.

The device proper consists of three parts, the first of which is a malleable-iron plate designed to fit between the jaws of the journal box in a manner similar to the present waste cellar (see Fig. 1). Resting upon this plate is a steel pan, Fig. 2, which contains the brush. This pan will hold from one to two pints of oil. The upper part of the brush is formed to fit the journal, the oil rising to the latter by capillary attraction. Dust and grit are excluded from the journal by a wooden dust guard fastened to the front of the malleable plate, and it also retains the pan in place. An oil cup is attached at some convenient point above the journal, as shown by Fig. 3, and a tube connection made to the pan. One of the principal objects of the cup is to enable measurement of the oil.

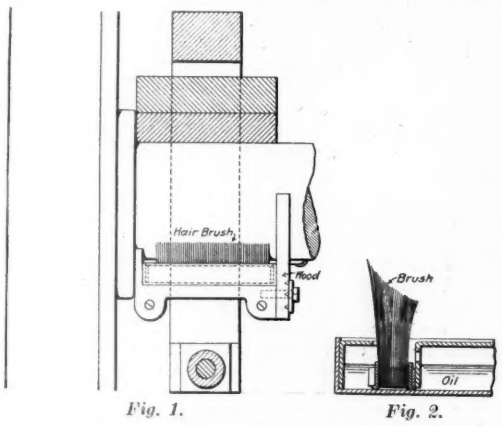


Fig. 1. *Fig. 2.*

Details of Brush Lubricating System.

The pan will contain sufficient oil for 2,000 miles and it may be filled without removal, although this latter may be readily done in a few moments. To prevent slopping and splashing of the oil a telescopic cover is placed on the pan; this also protects the oil from dust and cinders.

The system has been on trial on the Great Northern, Atchison, Topeka & Santa Fe and Chicago & North Western roads, and some very favorable reports have been made of the results, both as to satisfactory service and economy of oil from its use. Mr. Charles B. Moore is the inventor, and The Brush Lubricating System, Chicago, has been formed for its manufacture and sale.

Massachusetts Railroad Commissioners' Report.

The Railroad Commissioners of Massachusetts, James F. Jackson, George W. Bishop and Clinton White have issued the 34th annual report of the Board. The length of railroad in the State is 2,106 miles, substantially the same as one year ago. The usual statistics are given. The part of the report devoted to "railroads," meaning steam railroads, as distinguished from street railways, is taken up entirely with two subjects; passenger service in and around Boston and electric equipment of railroads. On these subjects the Commissioners have made an extended inquiry, one of the members having, we believe, visited England and the Continent of Europe. They find that fares to and from Boston, "however unequal and unscientific," are as a whole as low as are to be found anywhere. The railroads have complied with the Commissioners' recommendation of two years ago to sell 500-mile mileage tickets at two cents a mile, good for bearer. The New York, New Haven & Hartford has complied with the Commission's order to reduce to five cents the fare between Boston and Dudley street, and it is expected that the company will soon make reductions of other rates which are affected by this reduction.

Ever since 1872 the Massachusetts Statute Book has contained a requirement that workingmen's trains be run to and from Boston. On this point the report says:

The workman's car or train, in the narrow and restricted sense, is a well-established feature of railroad and railway service in foreign countries, but is less known and less favored in this country. It is the outgrowth of social conditions characteristic of great centers of population, where the necessities of large numbers of ill-paid workmen are thought to demand transportation cheap enough to enable them to travel between their homes and their places of employment, and where class distinctions with restricted privileges and graded accommodations are accepted as a matter of course. When railroads are owned by the State the theory that the public owes a duty to a class in the community which can best be discharged by furnishing cheap transportation is one which can readily be carried out, without reference to cost. Whatever the burden, it is borne logically, as an item of governmental expense.

In no place have the necessities of the poor demanded greater consideration than in and about London; but, while workmen's trains, with their restricted privileges, poor accommodations and limited liability on the part of the companies, have long been an established feature of English railroad service, there has been a tendency in late years, very marked in certain instances, to improve the accommodations, liberalize the restrictions, and so lessen the distinctions between this and a general cheap morning and evening service. The fact that the English railroads represent private capital, under the control of a management which has to maintain the investment upon business principles, has always made the inquiry into the cost of the service an important consideration. It is to be noted, also, that the cheap train service of England is customarily secured either as a condition accompanying privileges granted by Parliament to particular companies, or under the general act of 1883, known as the "cheap trains act." The latter is in substance an agreement that companies shall receive a benefit, through reduction in taxes, in return for running certain trains with very low fares. In general, the arrangement is in the nature of a bargain, in which the cheap fare is given in consideration of the grant of franchise or of exemptions from expense and limitations upon obligations and liability.

The Central London Railway, a modern type of electric underground railroad, and the Great Eastern Railway, one of the most important of English steam railroads, among others, operate cheap morning and evening trains under their respective charters. But, independent of this legislative agreement, the experience of these companies furnishes a profitable study of the results of dealing with a large traffic at low rates upon business principles. The history of the Great Eastern Railway is particularly in point. Taking up the problem at first as a compulsory requirement under the terms of its charter, the management developed an extraordinary suburban business, as a part of which it increased the cheap morning and evening trains much beyond the number required by law. The company, complying with its obligation to

provide homes elsewhere in place of those in the city uprooted by the construction of the railroad, seized the opportunity to create and maintain traffic by encouraging the building of suburban homes generally for the poorer people who found daily occupation in London. Thus the contribution of the company in low fares for the morning and evening hours was more than made good through the consequent travel at other hours at higher rates, and through the general increase in all kinds of business. In handling the enormous passenger traffic at the Liverpool street station of this railroad, said to be greater than that at any other station upon any other railroad or railway in the world, the compartment car and the construction of stations with floors upon the same level as that of the cars add greatly to the facility with which trains can be loaded and unloaded. It is to be borne in mind, however, that the enterprise of this company was favored by conditions unlike those which exist elsewhere. Not only was the field for exploitation a remarkable one, but street railroad competition has as yet been no factor in English suburban service. In connection with enterprises now on foot it promises to play its full part in the future.

Class discriminations in the use of trains, with rates so low as to prevent a reasonable return to stockholders, upon the theory that such concession is due to a particular portion of the traveling public, is contrary to the spirit of our institutions. This would be true, whether the companies were called upon to bear the burden, or whether the rest of the traveling public were to bear it through the payment of higher fares to compensate the companies for what they lose in the lower. In the one case it would be an unjust discrimination, and in the other an unlawful interference with private property. Whatever may be in the thought of those who uphold such service elsewhere, we have in this Commonwealth no conditions to warrant a plea that the public health or morals call for transportation for any class at a cost inconsistent with fair profit to the carrier. Aside from any legal question, however, compulsory legislation of this kind is contrary to the independent spirit abroad in the land. The poorest among us who are honest with themselves and with their neighbors have a just pride in demanding as much as is given to others, and the same pride in asking no more. The workingman of other countries must ride in the third-class compartment, and in some cases in special and yet poorer cars; with us, grades of accommodation are unknown to suburban service. Indeed, the attempt to compare our parlor coaches in use upon long-distance journeys with the first-class compartment of foreign railroads is generally made only in a constrained effort to find some basis upon which there may be an approach to favorable comparison in respect to cost of travel.

The question of cheap morning and evening trains in this Commonwealth is a business problem, to be solved upon business principles, and not one of enforced contribution to a public charity, either from the railroads or from the more prosperous part of the community to the less prosperous.

The only claim to be urged for a cheap morning and evening service is that the regularity with which certain persons ride daily at fixed hours affords the carrier the most favorable conditions for economical operation, and therefore entitles those who so travel to the lowest fares which are consistent with a profitable business. In determining the justice of such claim, the inquiry is into reasonable accommodations and reasonable fares for a given traffic. This is the same inquiry which the Board is from time to time making under its general jurisdiction upon the application of individuals and communities. The kind of accommodations which ought to be furnished and the rates of fare which ought to be charged must depend upon the character of the travel and the nature and cost of the service. As these differ upon different railroads, any question of cheap morning and evening trains should be taken up separately with the different companies, upon the bringing of proper proceedings by the parties interested just as under the English law proceedings may be brought from time to time before the Board of Trade, which makes investigations into all the facts pertinent to the case in hand.

We recommend that there be retained such part only of the existing laws on this subject as provide for methods of procedure before this Board.

ELECTRIC EQUIPMENT OF RAILROADS.

The progress made in the application of electric power upon street railroads is a matter of common knowledge. The electric car, moving over level ways, up and down steep grades, through tunnels and over elevated structures, has become so familiar that the horse car, pegging along the streets and toiling up the hills, with no pretence of consideration for the comfort of passengers, is almost forgotten. . . . After discussing the general question of electric motive power, reference is made to particular experiments in this country. The Nantasket Beach line of the New Haven road, electrified in 1895, is now claimed by the company to be unprofitable. Although by frequent service and low fares there was at first a large increase in business, recently the traffic has fallen off. On the 20-mile section from Providence to Fall River this company in 1901 adopted the overhead trolley and reduced the fare from 50 cents to 20 cents. This service is not wholly satisfactory, but traffic has increased and the financial results are apparently good. Brief notes are given of lines in Ohio, Illinois, Canada and Germany. Answering the real or supposed public demand for legislation the Commissioners say, in conclusion:

Upon every hand it is apparent that agencies are at work to develop the application of electricity so as to permit more and more its substitution for steam in the general operation of railroads. No incitement to pushing forward these undertakings can be more effective than the stimulus of self-interest on the part of those anxious to instal the electric in the place of the steam plant, and on the part of those eager in the handling of transportation to make use of every real advance in methods. It is idle to suppose that the end can be hastened by legislation in the effort to compel capital to follow experiment more closely than business prudence dictates.

The number of passengers fatally injured in collisions and derailments on the (steam) railroads of the State during the year was six, and of employees nine. Of passengers killed the ratio was one to 15½ millions carried. Professor George F. Swain reports on the bridges in the State, presenting a table showing eight new bridges built, 40 rebuilt and 41 strengthened. The heaviest locomotive in the State in 1892 weighed about 65 tons; now the Boston & Albany has some weighing 95, the Boston & Maine 85, and the New York, New Haven & Hartford, 78 tons.

STREET RAILWAYS.

The length of street railway built in the State during the year was 207 miles, and the total length now owned by the 105 companies is 2,111 miles, of which 333 miles is double-track; but 19 miles of this road lies in Rhode Island. In discussing accidents on street railways, the Commissioners say that there is nowhere to be found any better management than in Massachusetts, but it is also true that inexcusable carelessness is manifest on some of the lines. High speed is undertaken with apparent indifference to the dangers, and lessons of experience are ignored. On the public highway the street car should at all times be run under control. In the matter of the legal regulation of speed the municipalities have exclusive control, but they do not efficiently exercise this power and the report suggests that both citizens and street railway companies ought to have the right to appeal to some other tribunal. A paragraph in the report, evidently occasioned by the investigation of some of the collisions of the past year, reads:

The rules and regulations of street railway companies should cover all emergencies which can be foreseen, but should be brief and clear. Where discretion is to be exercised, it should be definitely so stated. A code of railway rules of the ordinary type too frequently contains too many vague general directions, which tend to confuse. Such rules may shield a management from responsibility in time of trouble, but they do not give fitting instruction to employees, with a view to prevent accidents or give them proper protection in case one occurs.

The Commissioners hold that all heavy cars operated at high speed should have a power brake. Such apparatus would cost from $350 to $400 a car. A law is recommended requiring cars to be equipped with such brake as the Board shall approve, within such time as the Board shall determine to be reasonable. On cars running long distances from their sources of supply and assistance, jack screws and other machinery should be required to be carried by law, as the Board may direct. On the order of the Legislature, the Board has again investigated street car fenders. Viewed as a life-saving device the fender sinks into insignificance when compared with the importance of equipping such a car with an efficient power brake in order to stop or check the speed of a car before striking the unfortunate individual, instead of trying to scoop him up after he has been struck. As experiments in testing different devices have always shown a large percentage of failures, so actual use shows that any type of fender will at times be rather a cause of injury than a safeguard against it. We have discovered no fender which, either in experimental test or actual use, has had an unvarying record of satisfactory results. At the critical moment somebody or something will fail to do what was expected. The Board must reaffirm its former opinion, that there is no fender which it ought at this time to recommend above others.

From the statistics of street railways we quote the following items:

	—Year ending Sept. 30.— 1902.	1901.
Assets—		
Construction	$59,870,035	$52,146,082
Equipment	22,061,198	18,890,989
Land and buildings	27,716,977	24,195,961
Total assets, incl. miscellaneous	123,200,558	107,250,656
Capital stock	60,036,328	54,069,933
Funded debt	37,751,000	34,312,500
Total liabilities, including misc.	119,441,792	103,598,042
Surplus	3,758,766	3,652,614
Dividends paid (5.23 per cent.)	3,138,711	...
Dividends paid (6.32 per cent.)	...	3,417,117
Cost per mile of main track	45,410	44,297
Investment per mile of main track	46,261	45,757
Gross earnings	23,486,474	21,766,346
Expenses	15,912,852	14,565,141
Net earnings from operation	7,573,622	7,201,199
Passengers carried	100,280,687	93,005,225
Earnings per mile of main track	9,609	9,998
Expenses per mile of main track	6,510	6,690
Net earnings per mile of main track	3,099	3,308
Killed —		
Passengers	18	20
Employees	10	17
Other persons	57	39
Total killed	85	76
Injured—		
Passengers	2,861	1,600
Employees	237	60
Other persons	1,070	797

The Plant of the Southern Creosoting Co.

The timber preserving plant at Slidell, La., which was acquired and is now being put in shape by the Southern Creosoting Co. was originally built for the purpose of creosoting the timber used in building the New Orleans and North Eastern trestle across Lake Ponchartrain. After this work was done the plant was closed, and has been standing idle.

The present owners found the material used in the old plant to be of the best quality, and it has been necessary only to modernize the plant and make certain renewals. This latter includes the installation of a new boiler battery and new vacuum and pressure pumps. An electric lighting plant has been put in and also an 80 ft. span Pawling & Harnischfeger electric crane having a 300 ft. travel. This crane is designed to cover the entire working space of the plant.

The impregnating cylinders, which are 6 ft. in diameter and 110 ft. long, were originally double-enders. They have been altered for charging at one end only, and to provide straight track connection for the timber buggies a 30 ft. transfer table having a 126 ft. travel has been put in. This table has two loading tracks for each cylinder.

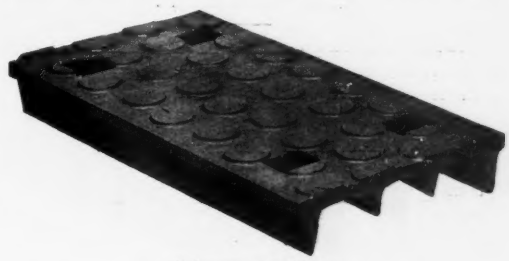
All pressure gages will be of the recording type so that an accurate record of the treatment of each charge of timber can be obtained.

In connection with the creosoting plant there will be a complete planing mill for making wooden conduits and cross arms. The company also has contracts with a number of large mills for their entire output. It is intended to use specially-designed pneumatic tools for all boring, mortising, framing, etc. The annual capacity of the plant is expected to be about nine million feet.

Two New Tie Plates.

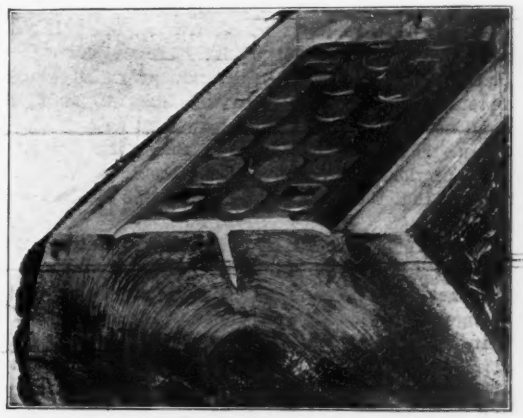
Two new forms of tie plates have recently been brought out by Mr. Benj. Wolhaupter, the designer of some well-known forms of plates already in general use. They are called the "Federal" and "Chicago" respectively, an illustration of each form being shown.

The Federal plate has as its distinctive feature a single, central flange forming a deep girder beneath the plate, which affords strength and stiffness at the point most needed. The sides of this flange are parallel except at the lower side where they converge to a cutting edge. The flange is made thin and a different method of rolling from that usually employed for this purpose enables this cutting edge to be made quite sharp, so that the flange cuts the fibers of the wood instead of crushing and displacing them.



Chicago Tie Plate.

On the top of the plate are numerous small circular losses forming the rail seat. This is to prevent direct contact between the rail and body of the plate, avoiding sand-wear and affording ample room for the escape of grit and other matter in all directions. The sides are given beveled edges to press into the wood and prevent sand and water from being drawn in between plate and tie, destroying the latter. This feature also adds to the strength of the plate.



Federal Tie Plate.

The plates are made from the re-rolled high-carbon steel. Some of the advantages claimed for it are: Ease and simplicity of application; relatively slight displacement of the wood fibers; possibility for free escape of sand; strength, as a result of the peculiar form, and of the material used; and the complete bedding of the plate in the tie.

The Chicago plate is designed for users who prefer a four-flange plate. As seen from the engraving its top is similar to the Federal plate. It is punched for spikes as necessity requires and the sides of the flanges are made to slope equally in both directions. It is rolled from new steel billets.

Both plates are made and sold by the Federal Supply Co., Chicago, of which Mr. Wolhaupter is Manager.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

"Single" Locomotives.

The single locomotive (one pair of driving wheels) seems likely to pass out of use before many years, even in Great Britain. Of course, there are a good many such locomotives still doing good work and new ones have been built within very recent years. The situation leads the editor of *The Engineer* to speculate as to the probable fate of the single, and he discovers some reasons for supposing that it may still endure for many years.

Indeed, we have often thought so. We have thought that for a traffic like that between New York and Philadelphia or New York and Boston a class of single engines might be useful and economical. As population grows and the travel between great cities not very far apart increases there must be more demand for comparatively light trains running considerable distances without stopping, and it is obvious that for such service the single locomotive has many advantages. In fact, as our readers know very well, two singles have been used in the service between New York and Philadelphia for several years. It is quite obvious that this whole situation is liable to be radically changed by the introduction of electricity, and it would be rash to say that electric motors will not come into general use for precisely the sort of service that single locomotives seem now especially well adapted to perform. In saying this we have in mind not the uses of electric power as now applied, but we have in mind the inevitable swift development of the art. But for the present, at least, it appears that there still is a field for the single locomotive.

The introduction of electricity at the present time calls for a large capital investment, and who can say but that less than a decade may see a complete change in the present system of electric traction and that one central station developing high potential alternating currents will replace the present complicated system of central stations, rotary converters and transformers? Until some such system as that has been perfected and tried, the wide-awake steam road manager need have no fear of disastrous competition except, perhaps, for very short hauls. It is a matter of record that but few interurban electric railroads pay, when interest on capital invested and depreciation are taken into account, and there is always the possibility of having to invest additional capital to keep pace with the growth of the electrical art. The steam roads at the present time can successfully compete with the electric roads by meeting them on their own ground and running short light trains at frequent intervals.

As before mentioned, it is this class of service that offers a fruitful field for the single locomotive. With modern track no difficulty is experienced in running the wheel pressure up to 24,000 lbs. On this basis a single driver locomotive weighing 48,000 lbs. on drivers with cylinders properly proportioned should have no difficulty in starting a load of 200 tons. Perhaps three cylinders would be necessary—two high pressure on the outside and one low pressure between the frames. The train resistance at a speed of 60 miles an hour is about 20 lbs. per ton and assuming a load of 200 tons gives $20 \times 200 = 4{,}000$ lbs. as the necessary drawbar stress. A drawbar stress of 4,000 lbs. at a speed of 60 miles an hour means that the horse power developed is 640. Assuming that each horse power requires 30 lbs. of water (a fair value), the total evaporation of the boiler is $30 \times 640 = 19{,}200$ lbs. per hour, a result which can be easily obtained from a boiler having 1,800 sq. ft. of heating surface or even less. The single driver engine also permits of the use of a very large fire-box, even though the diameter of the boiler shell be restricted by reason of the large drivers. It is also the freest running engine, having no coupling rods and but few moving parts.

How Often Should Trainmen Be Re-examined?

The inspector of the New York State railroad commission, in reporting recently on a rear collision which occurred in December on the Albany & Hudson (electric) railroad at Rossman's, recommended, among other things, that the trainmen be educated and catechised on the rules, and that the educational process be repeated each month. As the conditions on the Albany & Hudson and many other electric roads are now in many respects substantially the same as those on standard railroads, this decision or opinion of the inspector is of interest to railroad superintendents and trainmasters generally. Such frequency is unheard of, so far as we know, in steam railroad practice; and yet practice is not so uniform or so well settled that any one would be willing to say offhand that once a month is too often. Indeed, as the majority of superintendents appear to have anything but settled views as to the frequency with which they should examine their men; and if examination is necessary at all after a man is once accepted for a given position, it would seem highly desirable to find out whether a more definite theory cannot be formulated for use as a working basis. From the persistent way in which electric railroad men have tried to believe that they can run trains as fast as the steam railroads run them, but without adopting the expensive methods and safeguards of high speed lines, and in view of the known methods of managing the personnel of electric roads, one may surmise that frequent catechising is deemed necessary in the electric service, because new men are taken on more frequently, and because the old men are not so good at studying and comprehending rules as are conductors and enginemen of the old school. This, however, raises the question whether reiteration is the right remedy for a lack of proficiency; whether the true need is not a better grade of men. In some things much better results may be obtained from teaching a hundred-dollar man once in two years than a fifty-dollar man once a month.

The circular issued by the American Railway Association on examinations of railroad employees, the replies to which were published last April, seems to have studiously avoided the question of examination on knowledge of the rules, though full attention was given to the question of how many different methods are employed to test a man's "muscle." It is a matter of common knowledge, however, that practice varies widely. In the early days of the standard code some roads started out bravely to examine all the men on all the rules. But this was a tedious process, and with well-qualified men it often seemed a waste of time. Men who in the first half of the rules showed sufficient knowledge and a high degree of intelligence were not compelled to go through the last half. This idea was carried farther in some cases than in others, but it had its effect everywhere. The frequency of examinations was modified in the same way. Plans for holding "schools" semi-annually or quarterly were modified to annual or biennial intervals, if the superintendent had some reason for thinking that his men were not in special need of particular instruction. As a result of this tendency—a tendency often strengthened by changes in administration, or when a superintendent found himself burdened with new cares in some other direction—we now hear of superintendents who, according to their own statements, call their men in whenever it is thought proper to do so, but without any fixed plan; and who do not thoroughly test the men's knowledge of the rules; they only question on a few rules here and there, with a view to seeing whether the man has a good general intelligence and experience. By the answers given concerning one rule the questioner judges of the man's ability to deal with other equally difficult precepts. This is good as far as it goes, but is it enough?

We propound this question, not for the purpose of saying "No" and settling it, but as a suggestion that men of experience ought to settle it by conference. It is impossible to believe that of the varied notions held by different superintendents as to thoroughness and frequency all are right. Conditions may differ on different roads, but they do not differ to such an extent as present practices indicate. The manager who never re-examines his men on their knowledge of the rules, and who yet gets good service, must have men who have been well trained in the past. If this is so, the fact ought to be established, for the benefit of other managers whose results have been different; and the kind and degree of training should be published to the world. If men of one or more years' experience show a marked need of instruction at successive yearly or half-yearly examinations —not to mention monthly examinations—the question whether they were fairly instructed at the outset demands consideration; or perhaps the question whether they have the requisite native capacity for their positions. If old men ought to be re-examined periodically for the benefit of new men, rather than for their own good, that fact ought to be definitely stated. It is discreditable to a superintendent to catechise old and new men all in a bunch together, just because he has not found a satisfactory way to separate them into classes.

Some steam railroad officers will answer these queries by saying that if enginemen and conductors are once properly qualified that is enough; and the practice of numerous important roads indicates that this answer expresses the views of a great many officers. But shall we not heed the action of the few roads which do re-examine? Does not this question of freshening the men's knowledge bear any relation to the collision record? Electric railroad officers are giving more and more attention to standard railroad methods, and this suggestion of frequent examinations is, very likely, based in part on what has been learned from steam railroad practice. Have they selected their examples in the right places? A street-car man examining steam railroad practice in the present rushing times is likely to find cases where new men are very numerous and where it is known that there should be more thorough and formal instruction, and yet where the superintendent, for some reason, does not institute such instruction. What must the investigator conclude?

Why should we re-examine men who have both experience and good records? The argument for so doing is based largely on the fact that a two-line rule, coming up to be acted on only once in a month or a year, may be the vital link in a safety-chain that protects lives by preventing collisions. The good men—whose records are perfect—are the ones who re-examine themselves on such rules. The question is as to what, if anything, can be done to induce all the men to form this habit; to form the habits of caution, study and reflection which every old and competent railroader recognizes as necessary. Take, for example, the rule that "a freight conductor is responsible for the performance of duty by his brakemen." With a well-trained crew, with whom he is familiar, he can sit in his caboose on a cold winter night and trust them to shift a few cars at the front end of the train without his oversight, and no harm results. But some night he has a substitute brakeman, whom he thoughtlessly trusts in the same way, and that brakeman allows a half dozen cars to run down a five-mile grade and collide with and wreck a passenger train. If the new brakeman be entirely inexperienced the conductor watches him; if partly competent, the conductor compromises by half-way scrutiny; but, whatever the circumstances, a conductor may forget that he himself is bound by the rule above quoted, which perhaps he has not had occasion to definitely think of for weeks, but which is vital to his reputation and to the safety of the road.

Now, what better way to prevent such collisions than by rehearsals, questions, lectures or comment of some kind on that rule? Much has been said in favor of Brown's discipline, because it provides for bulletins, by which such an accident is used as an instructive lesson; but why wait for the accidents to occur near home? One of these accidents, one of almost any kind of accident, can be found every month by looking around a little among other railroads. Most superintendents need only recall their own past experience to see that success in handling trains depends largely, in the last analysis, on the habit of reflecting on rules, precautions and unusual combinations of circumstances *before the unusual circumstances arise.* If you have any conductors, enginemen or other responsible employees

who have not got that habit well formed, you are bound to admit the desirability of re-examining the men. And as long as men of years of experience commit errors which they had long before learned not to commit, the propriety of repeated re-examinations is equally manifest. The frequency of such examinations, and whether men of five years' experience should be treated different from those of two years' are elements of the question which demand careful consideration, but which limitation of space forbids us to discuss here. Many superintendents have already considered them; but why not compare notes and thrash out the subject in a way befitting its importance?

Proposed Legislation.

The Governor of West Virginia, in his annual message, lays down a code of principles for the regulation of railroads, and recommends the establishment of a railroad commission, with power to control rates. A bill has already been introduced in the Senate for the creation of such a commission.

The Governor of Wisconsin devotes his annual message to the Legislature chiefly to railroads. He urges that they be taxed according to the value of their property and be required to reduce their freight rates. He urges the establishment of a new railroad commission, with power to control rates.

The Governor of Montana, in his message at the opening of the Legislature this year, recommended the creation of a State Railroad Commission. A similar project is said to be on foot in Indiana, although it has not as yet gone any farther than a bill, which is said to be in the pocket of one of the members of the Legislature. Indiana appears to be one of the most active fields of the railroad legislative agitator, a committee of the railroad employees' brotherhoods having been formed to "look after" the Legislature. It is proposed to offer bills limiting the number of cars that may be run in a freight train, defining the number of men in the crew of a passenger train and requiring all kinds of safety appliances. This bill will provide for state inspectors. Another bill proposes to regulate the conduct of railroad relief organizations, and to forbid employees to sign away their rights.

One of the bills before the Indiana Legislature is one to relieve the Southern Railway from paying penalties amounting to $27,500, for failing to comply with the law requiring trains to be bulletined at stations. The agent at a small station is said to have neglected the law for nine months; a saloonkeeper to whom he was offensive made the complaint under the law and filed a suit for the recovery of the sum named.

Chicago press despatches indicate that the pressure of freight traffic has led nearly or quite all of the roads carrying freight east from that city to place embargoes on grain. It is said that the Baltimore & Ohio has raised the embargo on hay, which it announced a few weeks ago, but despatches from Pittsburgh and other points indicate that on other important commodities eastbound the embargo is continued, not only by this road but by all of the other principal lines. On the Pennsylvania Lines West of Pittsburgh the eastbound embargo applies not only to grain, but also to hay, lumber and iron ore. In New York City the sales of corn and wheat for shipment to Europe have lately been very heavy, but nearly all of the orders stipulate that the freight is to go by way of the Gulf of Mexico, the crowded condition of the railroads between Chicago and New York making it impossible to guarantee a reasonable time for the delivery of grain by rail. Those New York merchants who have for several years complained because the trunk lines leading to their city have not reduced their rates on grain so as to prevent the Baltimore and Newport News lines from getting so much of the traffic will now have occasion to remonstrate more loudly than ever; but they will at least see, now, that the refusal of the roads to make a stronger fight against the Southern ports was based on sincere and rational considerations. As long as it was a matter of rates alone, the grain men affected to believe that there was some concealed motive that ought to be exposed; but when a road actually refuses to receive their goods because the cars and tracks are filled with other goods paying higher rates, they will have to acknowledge that in claiming that grain rates are too low the railroads not only mean what they say, but know what they are talking about.

The New York State franchise tax law passed in 1899, under which street railroads and other corporations were assessed largely increased taxes, especially in New York City, has been declared wholly or partly unconstitutional by the Supreme Court. The decision, prepared by Judge Charles E. Parker, was published on Tuesday of this week. Two of the five judges dissented. The unconstitutional feature of the law is that giving the power of assessment to the state board of assessors, thus violating the principle of the Constitution that assessments must be made by local boards. It appears that, except for this clause, the law is affirmed; and experts in New York City say that the local assessors may now go ahead and assess the franchises. Since the law was passed the taxes on corporation franchises assessed in New York City have amounted to about five million dollars a year, the valuations being about 220 millions. All of these taxes are still unpaid. For the present year the local assessors, apparently with a view to forestalling a judicial decision of this kind, have assessed the *real estate* of the several corporations at amounts large enough to cover both the normal value of the real estate and the value of the franchises connected therewith. The present case will no doubt be appealed to the Court of Appeals. If the final decision should be in favor of the corporations the city will, it is said, lose the nine or ten millions of franchise taxes assessed in 1900 and 1901; but for 1902 and the present year the taxes are believed to be collectible.

Government Accident Bulletin No. 5.

The Interstate Commerce Commission has issued its fifth quarterly bulletin showing collisions and derailments of trains and casualties to persons during the months of July, August and September, 1902.* The number of persons killed in train accidents during the quarter was 263, and of injured 2,613. Accidents of other kinds, including those sustained by employees while at work, and by passengers in getting on or off the cars, etc., bring the total number of casualties up to 12,007 (845 killed and 11,162 injured). These accidents are classified in tables 1 and 2.

Table No. 1.—Casualties to Persons.

	Passengers. Kil'd.	Inj'd.	Employees. Kil'd.	Inj'd.
Collisions	12	757	136	782
Derailments	29	447	63	413
Miscellaneous train accidents (excluding the above), including locomotive boiler explosions	0	25	23	189
Total train accidents	41	1,229	222	1,384
Coupling or uncoupling cars	0	0	52	584
While doing other work about trains or while attending switches	0	0	32	1,235
Coming in contact with overhead bridges, structures at side of tracks, etc.	2	19	27	233
Falling from cars or engines, or while getting on or off	29	359	161	1,765
Other causes	7	362	272	3,992
Total (other than train accidents)	38	740	544	7,809
Total, all classes	79	1,969	766	9,193

Many items in the foregoing table show a marked increase over the same items in the last preceding bulletin, and many, also, are larger than in the same quarter of the preceding year. The present record includes a derailment in which 21 passengers were killed, and a collision of work trains in which 13 employees were killed, but, except in connection with these two items, there is no apparent reason for an increase in the totals, other than the well-known fact that during the three months now under consideration the traffic of a large majority of the railroads has been heavier than ever before. It is a matter of common observation that new men have been engaged for service in train and yard work in larger proportionate numbers than for many years before. Evidence tending to confirm this may be found in the list of coupling accidents where, among those killed, six had had less than one year's experience (three of them one month or less), and where 23 of the injured were thus classed, seven of these having worked less than five weeks. Similar notes of short terms of service occur in the other classes of injuries.

Table No. 2.—Collisions and Derailments.

	Number.	Loss.	Persons killed.	Persons injured.
Collisions, rear	386	$349,305	39	471
Collisions, butting	251	437,772	66	610
Collisions, trains separat'g	691	336,956	34	263
Collisions, miscellaneous	106	126,595	9	195
Total collisions	1,434	$1,250,628	148	1,539
Derailments due to defects of roadway, etc.	155	133,185	12	181
Derailments due to defects of equipment	420	356,655	7	113
Derailments due to negligence of trainmen, signalmen, etc.	75	62,110	8	41
Derailments due to accidental causes	86	80,852	24	167
Derailments due to malicious obstruction of tracks, etc	20	28,215	4	45
Derailments due to miscellaneous causes	258	277,867	37	313
Total	1,014	938,884	92	860
Tot. col'ns & der'lm'nts	2,448	2,189,512	240	2,399

Following the same style employed in setting forth some of the collisions in bulletins, 2, 3 and 4, a table is given of the most disastrous train accidents occurring in the quarter now under review. In this table are included not only collisions of all classes, but derailments as well. The number of collisions and derailments in which passengers were killed, or in consequence of which the damage to cars, engines, and the roadway exceeded $5,000, was 69. Of these, one-third (15 collisions and eight derailments) are briefly described in the table, the table being brought within readable compass by excluding all of

*The *Railroad Gazette* accident records for these months will be found on pages 691, 744 and 858. A comparison of these records with the Bulletin shows that the four most prominent accidents of the quarter—Rhodes, Ia.; Berry, Ala.; Packsaddle, Pa., and Trebeins, O.—are referred to in the table by letters *d, f, u, w*, respectively.

CAUSES OF TWENTY-THREE MOST SERIOUS TRAIN ACCIDENTS.

[NOTE.—R. stands for rear collision; B., butting collision; M., miscellaneous; D., derailment; P., passenger train; F., freight and miscellaneous trains.]

Item.	Record No.	Class.	Kind of train.	Killed.	Injured.	Damage to cars, engines and roadway.	Cause.
a	11	D.	P.....	3	30	$755	Loose wheel and spreading of track.
b	42	R.	P. and F.	5	1	800	Passenger train ran into rear of freight train in fog; persons killed (drovers) were in caboose of freight train. Engineman (of 15 years' experience) at fault for not controlling speed.
c	37	D.	P.....	4	17	2,500	Cyclone separated cars from locomotive and forced them off the track.
d	19	B.	Two work trains	13	17	3,700	Conductor trusted another conductor to hold all trains and prevent their entering specified section of track, but this instruction or request was not correctly understood.
e	43	R.	F. and F.	2	23	4,485	Freight train approached station too fast.
f	69	D.	P.....	23	96	8,189	Cause undiscovered; cars, engine, and track free from evidence of defect; speed 35 miles an hour; 5-degree curve.
g	16	D.	F.....	0	3	10,000	Runaway; damage mostly from fire.
h	15	D.	F.....	0	2	10,700	Runaway; cars broke loose from train and became uncontrollable on steep grade.
i	20	M.	P. and F.	0	2	10,900	Fireman ran engine out from side track without first sending a flagman to protect the movement; conductor and engineman apparently cognizant of his action.
j	5	B.	F. and F.	1	5	11,148	Telegraph operator received message reading "11:55;" copied it "11:05," but in repeating, wrote "11:55." Operator's experience, two years.
k	46	B.	P. and F.	3	2	11,200	Freight train (engine detached) left standing on grade with brakes not set; escaped control.
l	56	M.	P. and P.	2	4	11,800	Inferior train started from station without orders when, according to rule, orders should have been asked for. Conductor's experience, one month; engineman's, one year. Both forgot that the other train was soon due.
m	50	B.	F. and F.	4	4	12,000	Mistake of block-signal operators; also engineman (running under permissive signal) neglected to keep good lookout.
n	32	R.	F. and F.	1	1	14,000	Train passed block signal indicating stop; also flagman of forward train failed to protect his train by flag.
o	2	B.	P. and P.	1	69	14,000	Both engineman and conductor of one of the trains forgot a telegraphic order.
p	6	B.	F. and F.	3	2	14,918	Meeting order forgotten by both conductor and engineman.
q	26	B.	F. and F.	1	4	16,000	Engineman forgot meeting order; conductor evidently forgot also. Collision occurred only 8 minutes after the order had been delivered.
r	35	R.	P. and P.	2	2	17,000	Engineman approaching station neglected to properly regulate the speed.
s	64	D.	P.....	2	10	17,000	Passenger train running at about 60 miles an hour ran past misplaced switch and was derailed by entering side track too fast; red (danger) light on the misplaced switch was visible one-half mile away. Switch left in wrong position by freight conductor after he had used it a short time before. Engineman at fault (who was killed), sounded whistle a few seconds before, which indicates that he was not asleep. Had 9 hours' rest before going on duty.
t	18	D.	P.....	1	33	18,500	Unknown.
u	17	D.	P.....	2	4	23,300	Excessive speed; (estimated 66 miles an hour) on curve of 7 deg. 7 min.; outer rail elevated 7¾ in.
v	21	D.	F. and F.	4	0	25,000	Conductor and engineman forgot a meeting order.
w	9	M.	Passenger train and runaway freight cars.	4	25	50,500	Freight cars escaped control while being switched in yard, due principally to failure of brake chain; loss largely due to fire caused or spread by illuminating gas.
			Total	81	356	$308,395	

the cases in which no passenger was killed, and in which the cost is reported at less than $10,000. Besides the 23 cases tabulated, there were, among the 69 accidents, five collisions due to errors of train despatchers or despatchers' assistants; damage, $28,155; killed, three; injured, 15; three derailments in consequence of malicious misplacement of switches or other mischief; damage, $22,500; killed, three; injured, 16; and one collision of freight trains due to careless conduct of men who slept on duty. In this last-named case a freight train was side-tracked to wait for another train, and the whole of the crew, having been on duty 24 hours, fell asleep. On awakening, these men thought, or assumed, that the two trains which they were expecting had passed them, when, in fact, one of the two was yet to come. In one collision, due apparently to a train breaking in two, a brakeman was killed whose age was reported at only 18 years.

The most disastrous accident of the quarter was the derailment, which appears in the list as No. 69, item f, causing the death of 21 passengers. This was an excursion train, and the cause of the derailment is reported as undiscoverable. The published reports of this accident state that all of the passengers killed were riding on the platforms of the cars. The 13 persons killed in the collision numbered 19, item d, were workmen on gravel trains. This collision appears to have been due to a suspension of block-signal rules, and the circumstances indicate laxity in the maintenance of proper safeguards. Number 9, item w (collision), indicates the absence or non-use of a safety switch to prevent the escape, at the lower end of a switching yard, of cars which elude the control of the brakeman. Number 17, item u, represents the derailment of a train which was running at a very high speed. The engine, cars and track were in the best condition, so far as could be known. The train was scheduled to run very fast for over 100 miles, and there is no explanation of the disaster, except that the speed was excessive. The engineman who was running the engine was killed in the wreck, as was the fireman also. In most of the other cases among the 23 tabulated, the cause is explained more or less clearly in the table itself. Besides item f, one other derailment is reported as due to "cause unknown"; and the forgetting of telegraphic orders, by the men who had the orders in their pockets or immediately before their eyes, accounts for four collisions, averaging over $17,000 each.

Finally, accident No. 50, item m, a collision where the block system was in force, is remarkable as showing negligence on the part of four men. This negligence neutralized the safeguards of the block system; though it is to be observed that the starting of trains from a side track where the outlet switch is situated in advance of the starting signal is a modification of the system which is not approved by the best authorities. In this collision train A, running southward from H to P, was followed closely by train B, the latter being authorized to occupy the same block section with the leading train, under orders to run with speed under full control. The signalman at H told P to hold northbound trains for southbound train B, and claims that P answered "O. K." It does not appear, however, that the "O. K." was recorded; and according to the rule it should have been given in full—"O. K.; I will hold the block for train B." The signalman at P said once that he received no such order from H; at another time he claimed that he thought train A was behind train B. When the northbound train was ready to start, the signalman at P told the conductor and engineman that they could go as soon as train A arrived. The conductor and engineman acted on this oral statement, without waiting for the block signal to be cleared, their train being north of the block signal station, on a side track. Trains C and B collided, but each engineman had full view of the opposing train for half a mile, and the man on train C saw the other train, stopped, and sounded his whistle; but the southbound engineman appears to have been entirely oblivious of the northbound train until his engine struck it.

The bulletin gives a table of coupling accidents in the usual form, and also a detailed list, filling 12 pages, showing the cause of each one of the coupling accidents of the quarter. This list shows that "operations preliminary to coupling" is a class which includes a considerable percentage of the deaths each quarter; and also that a considerable share of the accidents are due to defective uncoupling mechanism and to the fact that engines and tenders are not in all cases equipped with automatic couplers. We copy the list of *fatal* accidents for one month.

List of Employees Reported as Killed in Coupling or Uncoupling Cars, August, 1902.

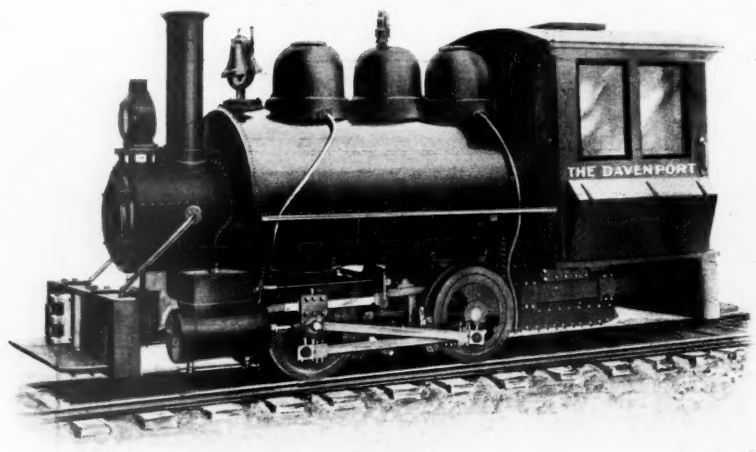
Record No.		Day or night.	Age.	Experience if less than 1 year.
3	Went between cars to uncouple safety chains; slack ran out...	D.	32	.....
5	Between cars fixing coupler; cars came together, catching him...	D.	34	.....
17	Head caught between drawheads while coupling	N.	..	1 wk.
27	Coupling missed; went in to open couplers; caught between cars..	N.	27	9 mos.
32	Supposed to have been between cars coupling when train set back	N.	23	.....
75	Failed to uncouple cars and jumped out from between cars, and was caught between car and platform	N.	25	.....
123	Trying to adjust knuckle; caught between couplers	D.	28	.....
140	Couplers failed to work, and car was knocked away about 20 ft.; while fixing coupler car ran back and caught him.....	D.	..	.....
156	Caught between cars while coupling same	D.	23	1 mo.
181	Reached in between cars for pin; chain missing, caught foot in frog	N.	42	.....
185	Went between engine and car to uncouple; caught between buffers	N.	48	.....
209	Went between cars to adjust knuckles; caught between drawheads	N.	27	.....
210	Train parted; went between to couple; train ran over him....	N.	26	.....
215	Trying to open knuckle; fell between cars	D.	..	.....
220	Coupling engine to log car, using link on account of engine being higher than log car, caught between car and engine.....	D.	..	.....

Some of the explanations of cause and circumstances are not full and complete. The Bulletin says that in the more serious cases, which are thus imperfectly reported, inquiry has been made and corrected reports have been asked for. Not all of these inquiries have elicited satisfactory answers. It has been found, however, that incomplete reports which on their face seem to show that a man was attempting the absurdity of coupling automatic couplers by hand, usually refer to cases of coupling to tenders which have only a link coupling, or adjusting couplers in front of moving cars, or cases erroneously reported as "coupling" when in fact the man was trying to correct something that was wrong about an uncoupling mechanism.

This Bulletin is the first one of the second year of the operation of the accident law, and it is prefixed by a page of notes showing what special information has been given in the four preceding bulletins. In the principal statistical matter all of the bulletins are of like form and arrangement, but in the notes and comments different subjects are emphasized in different bulletins. Bulletin No. 1 had brief notes on the worst collisions, and a page of notes on the causes of some of the casualties to trainmen not connected with train accidents; Bulletin No. 2 had notes on the causes of 27 butting collisions; No. 3 had notes on 41 rear collisions, and No. 4 on 26 collisions, including some from all classes. This bulletin also contains notes on deaths and injuries due to trains parting, and, in addition to the quarterly tables, has tables, in similar form, for the whole of the fiscal year.

The Davenport Contractors' Locomotive.

The Davenport Machine Works, Davenport, Iowa, has recently brought out a locomotive intended for contractors, an engraving of which is shown. They have 9 x 14 in. cylinders, 29 in. drivers and weigh in working order 28,000 lbs.; they are made either to narrow (36 in.) or standard gage. The working pressure is 150 lbs. The engine is provided with a well-designed hand lever brake, or a steam brake as desired. The grates are made for coal or wood. The tank capacity is 400 gals., and there are two sand domes. Willis Shaw, Chicago, is Selling Agent for these engines.



A Contractors' Locomotive.

The special equipment includes Ohio injectors, American safety valves, Detroit lubricators, Star headlight and Jerome metallic packing. Following are some of the principal dimensions:

Gage	3 ft. or 4 ft. 8½ in.
Total weight	28,000 lbs.
Wheel base	4 ft. 6 in.
Driving wheels, diameter	29 in.
Cylinders, diameter	9 in.
Piston stroke	14 in.
Valves, kind of	Balanced slide
Working pressure	150 lbs.
Boiler, diameter barrel	30 in.
Grate area	6⅔ sq. ft.
Tubes, number	53
Tubes, diameter outside	2 in.
Tubes, length	90 in.
Tank capacity	400 gals.

The Railway Signaling Club.

The January meeting of this club was held at Chicago on Tuesday of last week. About 25 members were present and President H. C. Hope (C., St. P., M. & O.) occupied the chair. Mr. L. R. Claeson acted as secretary. Mr. Hope made a brief statement telling of the doings of himself and the secretary since the November meeting. The sudden death of the late secretary, Mr. Tilton, had caused some delay in the publication of the Proceedings of the meetings held for the past year, but the matter is now in the hands of the printer and will soon be issued. Mr. Hope urged each member to secure extra copies of the Proceedings (which can be had on payment of the postage 6 cents a copy) for distribution among their friends, with a view to inducing not only signal engineers but also operating officers and others interested in signaling to join the Club. Four new members were elected.

Inquiry being made as to the work of the new committees, Mr. Mock (M. C.) stated that the committee on signal and track circuits had had some correspondence and was securing data for a report on the standard practice of various roads. The president said that in appointing the committees (the names of which were printed in the *Railroad Gazette* of January 9) he had tried to follow the principle of putting representative men from both the East and the West on each committee, and he hoped that some or all of the committees would be able to report at a meeting to be held in March. Mr. Mock spoke of the desirability of so making and approving the committee reports as to be able to send definite recommendations to the Maintenance of Way Association, this Association being the natural channel through which the signal engineers should seek to secure the adoption of their views by the railroad companies.

The principal discussion of the meeting was on the subject of derailing switches, the relative merits of the Wharton and the ordinary split rail design being discussed by Messrs. Mock, Christofferson, Foster, Relph and Pflasterer.

Mr. Mock asked the views of the members as to the propriety of using a switch and lock movement for the Wharton derail, for the purpose of saving one line of pipe. Mr. Christofferson thought that a derail ought to be locked in each of its two positions. It is very sensitive, and if it gets out of adjustment even ⅜ of an inch it may leave the point open. Mr. Relph thought that the Wharton derail should be locked in both positions. He has a number of these switches worked by a switch and lock movement but they lock only in one position and there is no indication when the switch is set to derail.

This was followed by an informal discussion of the relative merits of electric locks and mechanical time locks, to prevent signalmen from taking a route away from an engineman after once giving it.

Mr. Mock raised the question whether electric locking should be considered an essential requisite of installation at a crossing. It usually means $500 or more additional expense and some roads look upon it as an extra, while others do not. Mr. Relph asked whether the mechanical time lock was not as good as the electric; the main reason for using either one is to check and impulsive signalman when he has been asleep and (on awakening) clears one or more signals without sufficient thought. A desultory discussion ensued, going over much the same ground as that covered in the meeting last year, when Mr. Dunham's paper on this subject was read. Mr. Christofferson had found that a hand release, requiring a full minute to operate, was useful in that the delay of a minute annoyed the signalman enough so that they would make energetic efforts to find and repair defects in the electric locks.

Mr. Relph has four time locks. He prefers the mechanical to the pneumatic. One thing in favor of the time lock is that when the time expires it makes a great racket, attracting the signalmen's attention. He had found that signalmen would cut out pneumatic locking apparatus to avoid annoyance, so that he concluded that it was impossible to provide electric locking of any kind without leaving a loop hole in it. The time lock could be maintained free from these loop holes, which lead to loose practice. To Mr. Relph's statement Mr. Mock replied that it was not the office of the signal engineer to guard against maliciousness. The difficulties described should not be classed as faults of apparatus.

TECHNICAL.

Manufacturing and Business.

At the meeting of the Board of Directors of the Allis-Chalmers Company, held Jan. 15, the regular quarterly dividend on preferred stock was declared.

Universal bearings will be used on 850 cars to be built for the Delaware & Hudson by the American Car & Foundry Co., and on 150 tank cars building by the Union Tank Line at Lima, Ohio.

The Commercial Railway Equipment, Jersey City, has increased its capital stock from $5,000,000 to $6,000,000. D. H. Wilmirding, H. H. Lambertson, W. S. MacClymont and Kenneth K. McLaren are the stockholders.

The East Chicago Bridge & Iron Works, Chicago, with

a capital of $50,000, have been incorporated to make structural iron and steel. Charles O. Baughman, John W. Greekmur and N. E. George are interested.

The Archer Iron Works, Thirty-fourth place and Archer avenue, Chicago, are building a large number of coal charging barrows for the New Orleans & North Eastern and the Mobile, Jackson & Kansas City railroads.

The National Heat, Light & Power Co. has been incorporated in Canada with $1,000,000 capital stock. The office is to be at Quebec. Hon. Pierre Garneau and Osborne B. C. Richardson, both of Quebec, are incorporators.

The Bullard Machine Tool Co., of Bridgeport, Conn., has established an agency in Calcutta, India, in charge of K. E. Heynemann, who will also represent the Krupps, of Essen, and Ludwig, Loewe & Co., machine tool makers of Berlin.

The Westinghouse Electric & Mfg. Co., of Pittsburgh, make an extensive exhibit of electrical equipments for motor vehicles and motor-vehicle charging stations at the third annual automobile show at Madison Square Garden, New York.

The Standard Railway Equipment Co. has been incorporated at St. Louis by W. P. Murphy, W. R. Colcord, E. R. Hensel, James A. Carr and H. C. Bluedorn, to make and deal in pneumatic engines, hammers, drills and other tools.

Chas. B. Royal, at one time Master Mechanic on the Seaboard Air Line, and for the past year with the Galena Oil Co., has been appointed western manager of the Coffin-Megeath Supply Co., Franklin, Pa., with office at 205 Fisher Building, Chicago.

The Holland Palace Car Co. has been incorporated in Indiana to make cars for steam and electric service. It is intended to build combination sleeping and parlor cars under a special patent. Harris F. Holland, Indianapolis, Ind., is interested.

W. F. McGuire, formerly Sales Manager at Chicago for the air compressor department of the Laidlaw-Dunn-Gordon Co., has been made Manager of Sales Department for N. A. Christensen, with headquarters in the Herman Building, Milwaukee, Wis.

H. B. Underwood & Company, Philadelphia, have just finished a portable crank pin turning machine large enough to turn off pins in position up to 15 in. in diameter and 15 in. long. The machine is similar in design to their regular crank pin turning machine, and is claimed to be the largest ever built.

The Simplex Railway Appliance Co., of Canada, has been incorporated, with a capital stock of $500,000. The office will be in Montreal. The incorporators are William V. Kelly, George Scott and Robert P. Lamont, of Chicago; Wilson W. Butler, of New York, and Robert Davidson McGibbon, K. C., of Montreal.

The St. Louis Railway Equipment Co., with general office in St. Louis, Mo., has been incorporated in that State, with a capital stock of $100,000. Five hundred shares are to be preferred stock, entitled to a cumulative dividend at the rate of 8 per cent. The incorporators are A. G. Steinbrenner, August Miller, G. A. Bude, W. M. Feuerbacker and others.

The Morgan Engineering Co., Alliance, Ohio, recently invited the heads of its various departments to a dinner on Saturday evening, Jan. 10, at the Colonial Hotel, Cleveland. After the dinner the entire party attended the Euclid Avenue Theatre. A special train took the party to Cleveland and a special electric car conveyed them to and from the hotel. The company employs 1,100 men.

C. L. Berger & Sons, makers of instruments of precision, have outgrown their old quarters and have moved from 9 Province Court to 37 William street, Boston, Mass. The present business was founded 31 years ago by its senior member, C. L. Berger. The new factory which the concern has built will enable it to take care of the increased business and provide sufficient space for show rooms.

James Oscar Nixon, late engineer and manager of the silent chain department of the Link-Belt Engineering Company, of Philadelphia, died Dec. 27 from typhoid fever. He was a native of New Orleans and a graduate of Tulane University of that city, class '97. He spent a year at Wilmington, Del., as the manager for one of the branches of a large foundry, and three years ago became connected with the Link-Belt Engineering Company.

The Niles Car & Manufacturing Co., Niles, Ohio, has now building at its works ten 62 ft. passenger cars for the Seaboard Air Line; six electric cars for the Mahoning Valley R. R., Youngstown, Ohio; six for the Des Moines Electric Ry., Des Moines, Iowa; 50 for the Havana Electric Ry. of Cuba; 10 for the Toledo, Ohio, Electric Street Ry. Co., and two for the Western Ohio Ry. Co. The output for the next 45 days is expected to be 60 cars. As a result every department of the works is extremely busy.

The Pedrick & Ayer Company, for many years located at Philadelphia, Pa., has removed to Plainfield, N. J., to its new works just completed. The main building is 400 ft. long and 100 ft. wide, with independent power-house, blacksmith shop, pattern shop and pattern storage. This new shop has been equipped with electric traveling cranes and modern tools so as to enable the company to meet the largely increased demand for the standard goods which it makes, consisting of air compressors, air hoists, pneumatic riveters and special railroad tools. The selling office is at 85-89 Liberty street, New York city.

The Philadelphia Pneumatic Tool Co. reports that its sales for December exceeded those of any other month but one in its history. The business outlook for the current year is very bright and a number of large orders for pneumatic tools that had been held over until after the first of the year, have already been received and executed. A very gratifying feature of the Philadelphia Company's business is the large increase in railroad trade during the last six months of 1902 in the United States, Canada and Mexico. With its recent greatly increased facilities this company expects to double its last year's business. The Philadelphia Pneumatic Tool Co. is an independent company having no connection or working agreement with any other concern whatever.

The Alliance Machine Co. has been established in Alliance, Ohio, to make electric traveling cranes, special electrically operated machines, rolling mill and special machinery, hydraulic riveters, flanges, punches and presses. The officers are: President, W. C. Whitehead; Secretary and General Manager, W. H. Purcell; Treasurer, M. S. Milbourn. The plant of the company consists of a well-lighted building, 330 x 123 ft., containing the shops and offices. It was built by the Penn Bridge Co., ground being broken March 24 last. The plant was finished June 18 and in August the first shipment of orders was commenced. Since that time 30 cranes have been shipped to customers.

Iron and Steel.

The rail mill of the Maryland Steel Co. at Sparrow's Point was compelled to shut down for five days last week owing to the lack of fuel.

The Southern Iron & Fuel Co. has been incorporated by Lee C. Bradley, Hugh Morrow and C. S. Ellis, of Birmingham, Ala. The capital stock is $4,000 to begin with.

The Elyria Iron & Steel Co. has finished its new buildings at Elyria, Ohio, and has begun work on contracts. The dimensions of the main buildings are 90 x 400 ft., and 52 x 152 ft.

P. McManus, Superintendent of the American Steel Casting Co., has resigned. He has the record of producing the greatest tonnage in one day at the Sharon, Thurlow and Alliance plants.

Robert Poole, President of the Robert Poole & Son Co. iron foundries, Baltimore, Md., died in that city Jan. 15 at the age of 75. He designed and built the dome of the National Capitol at Washington.

A bill has been introduced in the House of Representatives authorizing the Committee on Naval Affairs to prepare a bill providing for 25 additional battleships, the cost of which shall not exceed $5,000,000 each.

Des Moines despatches state that S. R. Dawson has bought all the outstanding stock of the old Damascus Steel Co. and proposes to form a new company to make Damascus steel. Professor A. M. Haggard, of Drake University, is said to be interested.

The Knickerbocker Trust Co. of New York is carrying on negotiations for a consolidation of the manufacturers of steel tile and metal ceilings. Lee McCallum, of the New York Metal Ceiling Co., it is said, will be President. The Standard Metal Tile Co., recently incorporated in Delaware with a nominal capital of $1,000,000, will be the parent organization.

A Signaling Combination in England.

The businesses of Saxby & Farmer, Limited, Kilburn, and of Evans, O'Donnell & Co., Chippenham, are consolidated under the name of Saxby & Farmer, Limited. The main works will be at Chippenham, but the general offices will be at Kilburn.

Chicago Pneumatic Tool Company.

The Chicago Pneumatic Tool Co. recently decided to concentrate the purchasing for all of its manufacturing plants at the general offices in Chicago and accordingly a purchasing department has been opened at these offices in the Fisher Building. This department will be under the personal charge of Mr. Chas. Booth, who has been with the company for some years. The arrangement is one that has been in contemplation for some time and considerable benefit is expected to result from it. A committee of five composed of Messrs. J. W. Duntley, J. R. McGinley, Jos. Boyer, W. O. Duntley and J. B. Milliken, representing the Directors, has just returned to Chicago from a trip of inspection of the various plants of the company in the United States. Its report indicates a very favorable condition of affairs, with great activity at all plants and encouraging prospects for the coming year. Some of these plants require enlargement to provide increased facilities and steps toward that end are to be taken in the near future. The meeting of the domestic and foreign representatives of the Chicago Pneumatic Tool Company which was announced for the 12th inst. lasted three days and was well attended. Among other matters of business gone over, demonstrations of the new tools which are being brought out were made and recent improvements in other machines were carefully gone over. On the evening of the 12th, President J. W. Duntley gave a banquet at the Union League Club. The speeches of the evening showed that the business of the company for the year just closed had been double that of the previous year. Prospects for a largely increased business for 1903 are promising.

Signal Lamp Brackets and Sockets.

A committee of the Master Car Builders' Association has sent out a circular of inquiry concerning a standard for Signal Lamp Brackets and Sockets and their Location on the End of Passenger Cars. The circular may be obtained from the Chairman, Mr. W. F. Bentley, M. C. B., B. & O. R. R., Baltimore, Maryland:

Jan. 22, 6 p.m.—"The d'Auria Pumping Engine," Prof. Luigi d'Auria; "Slide-Rules in the Machine Shop as a Part of the Taylor System of Management," Mr. Carl G. Barth, Swarthmore, Pa.; "A Simplified Compound Engine," Mr. Ernest M. White.

Feb. 5, 8 p.m.—"Notes of a Mining Reconnaissance in British Columbia," with some reference to the occurrence of the platinum metals, Mr. Howard M. Dubois.

Feb. 12, 8 p.m.—"Notes on Recent Scientific and Electrical Developments Abroad," Mr. Wm. J. Hammer, New York.

Lectures.—The winter course will be opened by Mr. Wm. C. Henderson, on Friday, Jan. 16, 8 p.m. Subject: "Personal Experiences of a Gold-Hunter in the Unknown Interior of Alaska," illustrated with numerous lantern slides. Jan. 23: "The Forest Policy of Pennsylvania," Mr. George H. Wirt, State Forester of Pennsylvania. Jan. 30: "Mont Pelée and Its Work of Death," Prof. Angelo Heilprin, Philadelphia. Feb. 6: "Snap Shots Up To Date," Mr. W. N. Jennings, Philadelphia. Feb. 13: "Modern Uses for the X-Rays," Mr. Martin I. Wilbert, German Hospital, Philadelphia.

Scotch Locomotive Builders Consolidate.

The locomotive building firms of Dubs & Co., Neilson, Reid & Co., and Sharp, Stewart & Co., all of Glasgow, Scotland, according to cable advices from London, are to consolidate, with a capital of over £2,000,000. The first-named firm is now filling a contract for some thirty locomotives for Japan. The Neilson-Reid people export largely to South Africa. Sharp, Stewart & Co. have lately taken some fair-sized orders for locomotives for British Indian roads. The stockholders were to meet on Jan. 23 to ratify the agreement to consolidate.

A Track Laying Machine.

The Holman tracklaying machine, made by the D. F. Holman Tracklaying Co., Chicago, is being used by the Buffalo, Rochester & Pittsburgh in extending its line from Punxsutawney into Indiana County, Pa.

Electricity for Mexico City.

F. S. Pearson and other Boston men, associated with James Ross, Sir William C. Van Horne, George A. Cox, E. S. Gloston, and other Dominion Iron & Steel and Dominion Coal interests, have organized the Mexican Light & Power Company, with a capital of $12,000,000, of which $7,500,000 has been subscribed. Two-thirds of the subscription is by the Montreal interests. The company is organized to develop water power and supply electricity for Mexico City. It is expected that within two years it will develop 40,000 h.p. in the Sierra Madre Mountains, 90 miles from Mexico City.

The Carnegie Research Scholarships.

The Iron & Steel Institute (British) sends out another annual announcement asking for applications for the Andrew Carnegie Research Scholarships. Last year, six of these, valued at £100 each, were awarded, the recipients being O. Boudouard, Paris; W. Campbell, New York; A. Campion, Cooper's Hill; P. Longmuir, Manchester; E. Schott, Berlin, and F. H. Wigham, Wakefield. The object of the gift is to enable students who have passed through a college curriculum or have been trained in industrial establishments, to conduct researches in the metallurgy of iron and steel and allied subjects, with the view of aiding its advance or its application to industry. The results of the research are to be communicated to the Institute in the form of a paper submitted at the annual meeting, and the Andrew Carnegie gold medal may be awarded to the author, if the council considers the paper of sufficient merit. Candidates must be under 35 years of age, and must make application to the Secretary of the Institute on a special form, before the 28th of February. Last year the medal was awarded to Dr. J. A. Mathews, of New York. (Dec. 27, 1901, p. 896.)

Couplers for China.

The McConway & Torley Company, of Pittsburgh, Pa., has secured orders recently for car couplers, to be used on the Imperial Chinese Railway.

Separation of Oil From Water of Condensation.

Mr. Charles Oliver, Chief Commissioner of the New South Wales Government railroads and tramways, has invented an apparatus for separating oil from water of condensation. The apparatus was installed last November in the Ultimo power-house of the Sydney tramways—the fourth largest in the world. The special apparatus installed at the Sydney power-house consists of a metal tank, 10 ft. x 4 ft. x 4 ft., divided into chambers. Into this tank the condensed steam is directed, and the chambers are so arranged as to cause it to flow in a down and up direction, which has the effect of allowing the oil to regain its natural position "on top," and when sufficient has accumulated, flows off through escapes at the sides of the tank. The water passes through filter chambers, and thence to the hot well, from which it is pumped into a delivery tank and thence again to the boilers. The

separation of the oil by this process is practically perfect, analysis showing that only one part remains to 140,000 parts of water.

The yearly saving at the Sydney power-house, when the apparatus is in full operation and attached to both the vertical and horizontal engines is estimated, at the present rate of consumption, at 60 million gallons of water and 4,500 tons of coal. Based on a moderate calculation, the value of the immediate saving is put at $20,000 a year.

The Highway Bridge Over the Potomac.

The Secretary of War has approved the plans and specifications for the highway bridge across the Potomac, and has asked Congress to extend the time for the completion of the bridge to Feb. 12, 1906. The plans and specifications for the bridge were made by Col. Charles J. Allen, U. S. A., after consultation with Mr. D. H. Burnham, of Chicago, a member of the commission on the park development of the District. It was mainly at the suggestion of Mr. Burnham that the approved plans for the bridge give it a general elevation similar to that of the bridge being built by the Pennsylvania Railroad. As a result both bridges will have straight top chords, and in that way present an almost level sky line. The board of engineers has selected a site about 1,250 ft. above the Long Bridge, and on a line parallel with the railroad bridge now building. The specifications relate only to the bridge over the main river, consisting of two abutments, 12 piers and the spans connecting them; they do not include the shore approaches, which will be given consideration later. The highway bridge will have 11 fixed spans of 216 ft. each, from center to center of piers, and one swing span 290 ft. long. The bridge will have a roadway 40 ft. wide between curbs, with asphalt pavement and two sidewalks, each 8 ft. wide, with a granolithic pavement. On the roadway will be laid a double track for an electric railroad with overhead trolley.

Locomotives for Japan.

Dubs & Co., Neilson, Reid & Co., and Sharp, Stewart & Co., all of Glasgow, and Beyer, Peacock & Co., of Manchester, are bidding on 32 locomotives, weighing 49 tons, and of the Belpaire type, including two compound engines for the Japanese railroads. Three German firms were also asked to tender, but no American firms, it is understood, as on the last occasion, were included in the list. The Dubs people recently got an order for 30 locomotives for Japan at £2,075 per engine, delivered. Delivery of the 32 new locomotives is required before the end of May.

New Taylor Interlocking at Chicago and St. Louis.

The Taylor Signal Company, of Buffalo, N. Y., has taken the contract to make and put up the interlocking signals at the new terminal station of the Chicago, Rock Island & Pacific and the Lake Shore & Michigan Southern, at Chicago. This machine, "all-electric," will have 168 working levers and 28 spare spaces. These levers will work all the switches of the terminal station and those of the main tracks for 2,000 ft. out. The same company has received a contract for putting in its electric machines at East St. Louis and Madison, Ill., and at North Market street, St. Louis, all on the lines of the Terminal Railroad Association of St. Louis. The East St. Louis plant will require 144 electric levers and the other two will have 96 each. At Newark, Ohio, on the Pennsylvania Lines West of Pittsburgh, the Taylor Company will put in a 68-lever all-electric machine.

Pintsch Gas Lighting.

The amount of business done by the Safety Car Heating & Lighting Company during the year 1902 was very large. During the year 2,051 cars were equipped with the Pintsch light in the United States, Canada and Mexico; 75 gas buoys were bought by the Light House Department of the United States and Canada, and 1,811 cars were equipped with the Safety Company's standard steam heating systems. The Pintsch lighting system has been adopted by over 200 railroads in the United States, Canada and Mexico, where it is applied to 20,017 cars. The Pintsch buoy system is applied to 240 buoys and beacons in the same countries. The steam heating systems of this company are adopted by 130 railroads in the United States and are applied to 11,050 cars. Up to Oct. 1, 1902, the Pintsch system has been applied to 116,000 cars, 5,000 locomotives and 1,500 buoys and beacons in the world. The simplicity of operation and economy in maintenance of the Pintsch system has been so satisfactory that it has practically been adopted as the standard lighting system by the majority of the railroad lines and the light house boards of the world.

New Car Wheel Works in McKees Rocks.

The first experimental run of the new Central Car Wheel Co.'s plant at McKees Rocks, Pa., was begun last week. The new plant is controlled by the Pennsylvania Malleable Iron Co., which also operates a malleable iron works at McKees Rocks. When in full operation, it is expected that the capacity of the new works will reach about 500 wheels a day.

Stanley Electric Mfg. Co.

The directors of the Stanley Electric Mfg. Co. on Jan. 10 authorized that the capital stock be increased from $3,000,000 to $10,000,000. The stockholders will meet on Feb. 11 to approve this action of the Board. Plans for this great increase of facilities have been under way for some time to place the company on a basis to compete favorably with other large electrical manufacturers. There is no truth in the reports that the Stanley Co. will be sold to the General Electric Co. The Stanley Co. recently got an order from the New York Edison Co. aggregating over half a million dollars for dynamos and other electrical apparatus, some of which is to be the largest of its kind ever built. Funds will be provided by this increase of capital for certain important developments which the engineers of the company have been planning for some time. Among these developments is a new system of operation for heavy long-distance electric railroads.

Fort Pitt Spring & Manufacturing Company.

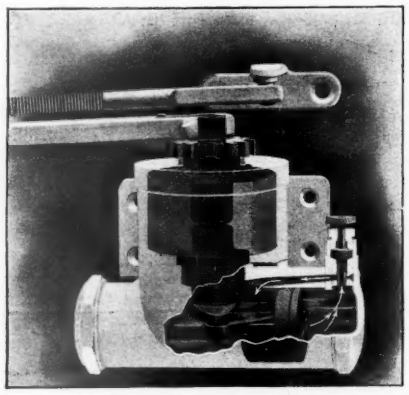
This company, which is to make a specialty of car and machine springs of all kinds, has begun work at its new plant at McKees Rocks, Pa., on the line of the Pittsburgh & Lake Erie, and Pittsburgh, Chartiers & Youghiogheny. The new plant is to have a capacity of about 15,000 tons per year. The main building, which was finished some time ago, is equipped with modern machinery to make all kinds of helical springs from the smallest or lightest to the largest or heaviest. It is the intention of the company to shortly add other equipment to make elliptical springs as well as pressed steel specialties of a large variety. Martin B. Foley is General Manager; F. W. Wallace is President.

More Moving Stairways.

The Manhattan Elevated Railroad has plans to install escalators (moving stairways) at its stations on the Sixth avenue division at 33d street and 42d street for both the uptown and the downtown platforms.

The Blount Door Check.

The Blount check is in successful use on the doors of many railroad coaches. It combines a powerful coil



spring (which furnishes the power to close the door) and a metallic piston moving in a metallic cylinder against a non-freezing liquid (which furnishes the checking or controlling power). A simple regulating valve shown at the right in the illustration is controlled by a key and can be adjusted so as to give any desired action. It is made in various sizes and can be adapted to doors of all kinds and shapes. It is also extensively used on exterior and interior doors of all kinds and on ferry boats where the conditions are extremely severe. It is made by the Yale & Towne Manufacturing Co., New York and Stamford.

Western Union and Pennsylvania.

In the United States Circuit Court at Newark, N. J., Jan. 14, Judge Kirkpatrick granted a permanent injunction prohibiting the Pennsylvania Railroad from destroying or removing the poles and wires of the Western Union Telegraph Company from the railroad right of way. The case will be carried to the United States Circuit Court of Appeals. The Western Union had asked the Court to direct the condemnation of a right of way for itself coincident with that of the railroad, but on this the court postponed its decision. At Pittsburgh Jan. 15, Judge Buffington, in the United States Circuit Court, decided two cases brought by the Western Union. One was a petition to condemn a right of way for the telegraph lines along the railroad; the other was an application for an injunction to prevent dispossession. The Court refused to grant the petition for condemnation proceedings, and dismissed the motion for a preliminary injunction.

Consolidated Lake Superior Company.

The details relating to the $3,500,000 loan to be made to the Consolidated Lake Superior Co. by a syndicate of Philadelphia and New York banks, headed by Speyer & Co., have been settled and the loan will become available immediately. Vice-President Theo. C. Search has resigned as Treasurer. Since the resignation on Dec. 12 last of F. S. Lewis as President, the duties of a President have devolved upon Mr. Search, and he will continue to perform them until the vacancy is filled. J. Parke Hood, formerly Treasurer of the Choctaw, Oklahoma & Gulf R. R., has been elected Treasurer in place of Mr. Search. Thos. DeWitt Cuyler, Vice-President of the Commercial Trust Co., who was elected a director about three weeks ago, has also resigned. He is succeeded by Gordon Abbott, President of the Old Colony Trust Co., of Boston.

The Shellpot Shops of the Pennsylvania.

The Pennsylvania is building new shops at Shellpot, outside of Wilmington, Del., and has contracted for the various buildings, and they are now under way. Among the contractors are Messrs. Ryan & Kelley, for grading and masonry; Phoenix Iron Co. and the American Bridge Co., for iron work; Messrs. Armstrong & Printzenhoff, Ryan & Kelley, J. W. Ferguson, A. S. Reed & Bro. Co., for the buildings proper; Warren-Ehret Co., for roofing; Messrs. F. A. Black & Sons Co., J. W. Webber, for painting; The Vulcanite Paving Co., Filbert Paving & Construction Co., J. O. Ellinger, for paving and concrete work; and Messrs. W. P. Oglesby, and Boon & Sample, for plumbing.

THE SCRAP HEAP.

Notes.

The track walkers of the Boston & Albany who watch the rock cuts in Berkshire County during the winter are now required to wind a registering clock at certain points every hour; and the records, made on paper, are examined weekly by the superintendent.

For the last week or two news about the Union Pacific strike has been strangely scarce; but on Monday of this week it was reported from Omaha that all of the steam fitters and carpenters in the shops at that city had struck because the company decided to adopt the piecework method of payment.

The sleeping car tickets bearing internal revenue stamps returned by the Pullman Company to the Treasury Department at Washington, for the rebate due in consequence of the abolition of the tax, filled 36 cases and weighed 210 tons. A half dozen clerks are spending six months or so assorting the tickets.

Euclid Madden, the motorman of the street car which killed William Craig and injured President Roosevelt at Pittsfield last summer, has been tried and sentenced to six months' imprisonment and to pay $500 fine. Madden pleaded guilty to the charge of manslaughter, as did also the conductor, who was also indicted. The conductor's case was not tried and he was released without bail.

The Delaware & Hudson has made a general increase in the wages of its employees, at rates varying from 5 to 10 per cent. The Boston Elevated Railroad (operating both elevated and surface street lines) has announced to its employees a material increase in wages, the rate varying according to the length of the individual's service in the employ of the company; and it is also announced that pensions are to be paid. Men learning to run cars will hereafter receive pay, and extra men will receive some pay while waiting.

It is announced that in consequence of the severity of the coal famine and the crowded condition of the lines, the Lehigh Valley has temporarily discontinued the Black Diamond express west of Wilkesbarre. The company also determined to take off the train which carries mail and newspapers that start from Philadelphia at 2:30 a.m., but the order was recalled on the receipt of a protest from business men and publishers in that city. It was shown that the first-class mail matter sent by this train aggregates about 8,000 pieces, and the newspapers 2,399 pounds.

For the present session of the Legislature of Montana the Northern Pacific Railroad issued to the members passes good for 60 days. The limiting of the passes to such a short period appears to have been offensive to many of the members and they refused to accept them, and now the President of the road, in a letter which has been published, gives the reason why the passes were not made for a whole year, as in the past. He says that "sometimes in previous years such passes have been loaned without consideration; or, for a cash equivalent, members have used such passes to the Capitol the first of the week and lent them to ticket brokers for sale for short trips, receiving the same back in season for their return trips to their homes at the end of the week. At the end of the session the passes have been sold outright by those who had no further use for them, and we have taken them up in the hands of improper parties on our trains."

Traffic Notes.

The State Railroad Commissioners of Louisiana have ordered that sleeping car companies shall not charge more than $1 a seat between any two points in Louisiana.

The War Department has contracted to send 300 soldiers from the East to San Francisco, over the Southern Railway and the Choctaw line of the Rock Island, by way of Memphis and El Paso.

After this month the Pennsylvania will discontinue rebilling at Pittsburgh eastbound freight coming from the Pennsylvania Lines West of Pittsburgh.

The Chicago & Alton has announced that demurrage will be charged on coal after 48 hours, instead of after five days, as heretofore. Newspaper accounts indicate that other roads at Chicago have adopted or will adopt the same rule.

Western papers state that the Great Northern Railway has employed George C. Crose, a former speaker of the Lower House of the North Dakota Legislature, to make a tour of small towns in the eastern States with a view to inducing farmers to emigrate to places on the line of that road. It is said that Mr. Crose will be engaged in this work about six weeks.

Train Robberies in 1902.

The Express Gazette prints a page of notes of the train robberies reported in the United States during the past year. The total number is 23. In 1901 the number was 16, and reading back from that year the totals are 29, 15, 28, 30, 28, 49, etc. The last number, the highest in the list, is the total for 1895. The total number of hold-ups in 18 years has been 328, in which 98 persons have been killed and 107 injured. The present record, which, to be more precise, should be described as a record of robberies and *attempts* at robbery, includes cases in Arkansas, Colorado (2), Idaho, Illinois (2), Indian Territory (2), Iowa (2), Kentucky, Louisiana, Maryland, Missouri (4), Montana, Nebraska, South Carolina (2) and Tennessee (2); a total of 13 States, two

of which were among the original 13, and one territory. Seven stage robberies are also reported in 1902.

The Stevens Institute of Technology.

A series of interesting events in connection with the formal inauguration of Mr. Alexander C. Humphreys as President of the Stevens Institute of Technology will take place on Feb. 4th and 5th. On the evening of Wednesday, Feb. 4th, there will be held in the Carnegie Laboratory of Engineering a reception given by the Alumni to President Humphreys. This will take the place of the usual mid-winter meeting of the Alumni Association. On Thursday, Feb. 5th, at two o'clock, the inauguration ceremonies will be held in the Carnegie Laboratory. At seven p.m. there will be a reception and dinner, tendered by the Alumni, at Sherry's, 44th street and Fifth avenue, New York City. Many distinguished guests are expected to be present at this dinner. Acceptances have been received from the presidents or other representatives of many leading universities and technical institutions of the East.

Proposed Naval Increase.

The Committee on Appropriations of the House of Representatives has adopted the entire report of its sub-committee on the naval appropriation bill which provides for three battleships and one armored cruiser of 16,000 tons each, and two steel training ships and one wooden brig for training purposes.

A Chicago Engineers' Club.

We noted in our issue of Nov. 21, page 899, the formation of a club of engineers in Chicago, giving the list of charter members and stating that it was primarily a luncheon club and would meet daily at the lunch hour. Permanent organization of the club has now been effected, and a brief list of rules drawn up for its government. They provide that the government and management shall be vested in an Executive Committee composed of five members to be elected annually, Messrs. Ralph Modjeski, Onward Bates, L. E. Ritter, A. V. Powell and C. W. Melcher being elected for the current year. The membership is limited to 100 resident and 50 non-resident members, with an initiation fee of $5, and annual dues of $10. The place of meeting is in the Great Northern Hotel.

Franchise for Motor Cars.

A franchise has been given to Chicago parties to equip the street railroad system of Harvey, Ill., with gasolene motor cars. Each car will be equipped with two motors of the Worth type. The franchise also provides that 40 tickets shall be sold for $1.00. Harvey is an industrial town of about 5,000 inhabitants, a few miles south of Chicago.

The Contracts for New Cruisers.

The New York Shipbuilding Company, of Camden, N. J., last week filed at the Navy Department a formal protest against the award of the contract for the armored cruisers "Washington" and "Tennessee" to William Cramp & Sons as recommended by the Naval Board on Construction and noted last week. The protesting company claims that its bid for the two ships on the Navy Department's plans was the lowest, and that the proposal to allow the Cramp Company to substitute different boilers is a violation of the conditions under which they were asked to bid and should be considered a new bid. It is also claimed that a legal question is involved and that the matter should be referred to the Attorney General for his opinion.

The Department of Commerce and Labor.

The House of Representatives after taking up on Jan. 15 the bill to establish a Department of Commerce and Labor, passed the bill on Jan. 17 by a vote of 137 to 40. The proviso for a bureau of insurance was stricken out, and a provision added authorizing the President to transfer the Interstate Commerce Commission to the new Department. The bill was sent back to the Senate on Jan. 19 and referred back to the Committee on Commerce, and a conference committee of the two Houses will probably take up the bill within a very few days.

Lehigh University Register.

The register of Lehigh University, South Bethlehem, Pa., just issued, shows the attendance of 581 students, from 27 States and six foreign countries. There are 52 in the teaching staff. Twelve courses of instruction are offered at the University, which include several branches of engineering, and a list of the graduates, 1,248 in number during the 37 years of its existence, indicates that it is exerting a marked influence on the industrial development of the United States, and also of foreign countries.

Several prize scholarships will be open to competition at the annual examinations in June, affording from $100 to $150 annually, in addition to free tuition. Provision is also made for worthy and needy students whereby they may postpone payment of tuition until after graduation.

District of Columbia Appropriations.

The Appropriations Committee of the House of Representatives on Jan. 17 ordered a favorable report to the House on the appropriation bill for the District of Columbia for the fiscal year ending June 30, 1904. The bill carries $7,617,049, exclusive of the water department, while the estimates called for $10,872,372, the amount provided being $845,874.97 less than the appropriation for the current fiscal year.

Like the New Jerusalem.

A press despatch from Nevada City, Cal., headed "Gold Between the Tracks," says that the Nevada County Traction Company, in ballasting the track in Nevada City and Grass Valley during the past few days, has been using rock that assays all the way from $2 to $25 a ton. The quartz is free milling and samples found between the tracks plainly show gold. A boy was engaged in breaking large bowlders when a miner happened along and picked up a piece of rock, discovering that it contained gold. Other finds quickly followed. The reporter, not to be outdone by his metropolitan brethren, tells us that "passengers on this road nonchalantly kick loose a nugget before boarding the cars, and use it to pay their fare"; and he adds that the company has posted the following notices:

"No change will be given to passengers paying fare with nuggets."

"Nuggets will not be received in payment for commutation tickets."

"Boardite" Carriage Wheels.

We have recently seen, on three of the railroads running into London, carriages fitted with trial sets of these wheels, and we believe they are proving very satisfactory; they are manufactured by the Boardite Company, 48 Victoria Buildings, Manchester. The material known as "Boardite" is a fibrous or woody compound solidified under very great pressure, and as far as we have been able to gather there is every prospect of it becoming a rival to teak for the discs or wood centers of railroad carriage wheels. The makers claim that it has the advantage over teak in the fact that it will not burn, which by the way is an important consideration, as by the failure of the brake to release on a particular carriage of express trains, teak wheels have been burned by the intense frictional heat generated between the tire and the block, or the rail. It is also stated that extensive trials have demonstrated that this material is not affected by extremes of temperature, or climatic conditions, and consequently there can be no shrinkage or swelling to interfere with the lightness of the tire. We have seen a sample disc tried and its toughness and strength is remarkable, but at the same time it can be bored and turned and adapted to meet the present wheel bosses, tires, and fastenings. As the crude material is of a plastic nature, it should be of use for many other purposes besides wheel centers, and for which moulds can be made to give it the final shape required.—*The Railway Engineer.*

LOCOMOTIVE BUILDING.

The Chicago & Alton has ordered 10 passenger locomotives from the Baldwin Works.

The Jonesboro, Lake City & Eastern has ordered one locomotive rebuilt at the Hicks Locomotive & Car Works.

The Delaware & Hudson is having 20 locomotives built at the Schenectady Works of the American Locomotive Co.

The Atlas Portland Cement Co. is having two locomotives built at the Rhode Island Works of the American Locomotive Co.

The Fort Worth & Denver City is having five locomotives built at the Rhode Island Works of the American Locomotive Co., in addition to the three already reported in our issue of Oct. 31.

The Canadian Pacific has ordered 20 additional locomotives from Neilson, Reid & Co., Hyde Park Locomotive Works, Glasgow, Scotland, which have the same specifications as the 12 locomotives recently ordered from this company.

The Chesapeake & Ohio, as reported in our issue of Jan. 16, has ordered 50 G7 simple consolidation locomotives; half of the order to be built at the Baldwin Locomotive Works and half at the Richmond Works of the American Locomotive Co., for November delivery. The locomotives will weigh 186,000 lbs., with 170,000 lbs. on the drivers, and have 22 x 28 in. cylinders, 56 in. drivers, wide fire-box boilers, with a working steam pressure of 200 lbs.; heating surface, 3,042 sq. ft.; 370 Shelby steel tubes, 2 in. in diameter, 14 ft. 9 in. long; fire-box of steel, 90 in. long and 75 in. wide; grate area, 46.8 sq. ft.; tank capacity, 6,000 gallons of water and 10 tons of coal. The special equipment includes: Westinghouse air-brakes, Gollmar bell ringers, Franklin magnesia boiler lagging, Simplex brake-beams, Corning brake-shoes, M. C. B. couplers, Chesapeake & Ohio standard headlights, Hancock injectors, U. S. bronze journal bearings, U. S. metallic piston and valve rod packings, Star safety valves, Watters sanding devices, Nathan sight-feed lubricators, Star steam gages, Latrobe driving wheel tires and Standard Steel Co.'s truck wheels.

CAR BUILDING.

The Chatfield Mfg. Co. is having five freights built by Hammond & Co.

The American Car & Foundry Co. has miscellaneous orders for 64 cars.

The Madeira Sugar Pine Co. is having 10 freights built by Hammond & Co.

The Union Tank Line is reported to be building 150 tank cars at Lima, Ohio.

The San Pedro, Los Angeles & Salt Lake is having two coaches built by the Pullman Company.

The Vandalia is having 200 freights built at the Detroit Works of the American Car & Foundry Co.

The Seaboard Air Line has ordered ten 62 ft. coaches from the Niles Car & Mfg. Co., Niles, Ohio.

The Denver & Rio Grande has ordered six baggage cars from the American Car & Foundry Company.

The Butte, Anaconda & Pacific is having 50 freights built at the Russel Wheel & Foundry Co., Detroit, Mich.

The Alabama & Vicksburg (Queen & Crescent) has ordered 100 box cars from the American Car & Foundry Co.

The Chicago, Burlington & Quincy is having 100 freights built by the Haskell & Barker Car Co., Michigan City, Ind.

The Chicago & Alton has ordered 30 coaches from the Pullman Co., eight coaches from Harlan & Hollingsworth, and eight baggage, four chair and two coaches from the American Car & Foundry Co.

F. M. Hicks, of the Hicks Locomotive & Car Works, has received orders to rebuild cars for the following companies: Huntingdon & Broad Top; Dow Chemical Co., Cobb Logging Co., and the Wabash & Chester R. R.

The Southern Pacific is building 50 special cars for silks and teas at its own shops, at Sacramento, Cal. The cars are to be 50 ft. long, with wooden frames, passenger trucks, steel tired wheels, and painted similar to coaches, in order to maintain a uniform appearance in passenger trains.

The Duluth & Iron Range has ordered 450 ore cars from the Pressed Steel Car Co. for March, 1903, delivery. The cars will have a capacity of 100,000 lbs., and will be 22 ft. long, 8 ft. 6 in. wide, and 9 ft. high, with metal frames and underframes. The special equipment includes O. H. steel axles (Pressed Steel Car Co.), Pressed Steel Car Co. brake-beams, M. C. B. standard brake-shoes, Westinghouse brakes, Tower steel couplers on 224 cars, Chicago steel couplers on 226, Westinghouse draft rigging, McCord malleable journal boxes and mineral paint.

BRIDGE BUILDING.

ARKANSAS.—The Memphis, Helena & Louisiana (Mo. Pac.) will need three bridges to cross the Arkansas, White and St. Francis Rivers.

Several important bridges will be needed on the White River Railroad. (See R. R. Construction column.)

ASHER, OKLA. T.—A bridge will be built over the South Canadian River at this point, on the Rock Island-Choctaw extension.

There is also a company being organized to build a steel toll bridge across the South Canadian at this place.

BIG TIMBER, MONT.—The County Commissioners have awarded a contract to Hewett & Company, of Chicago, for the new steel bridge across the Boulder River, one-half mile south of town, and the repairing of five other bridges in the county, three of them crossing the Boulder and the other two the Sweetgrass.

BOSTON, MASS.—Wm. Jackson, City Engineer, has reported to the Mayor on the progress of rebuilding Broadway bridge. He says, in part: The first contract on the work was dated June 1, 1901. The abutments are finished. The three water piers are to be built by Holbrook, Cabot & Rollins, and finished Aug. 1, 1903. A contract for the steel work of the fixed span of the bridge was made with the Boston Bridge Works, Oct. 29, 1902, and shop work is now in progress. The time for completion of this work is Oct. 1, 1903. Contracts are yet to be made for the flooring, sidewalks and railings of the brdige, and for the reconstruction, wholly or in part, of the draw span.

BRIDGEPORT, CONN.—It is estimated that a new steel bridge over Berkshire Mill pond will cost $21,213. P. Kennelly, Commissioner of Public Works.

CAMBRIDGE, MINN.—Bids are wanted Jan. 27 for an iron bridge in this village. Address T. C. Bleugren, County Auditor.

CAMDEN, N. J.—The Board of Freeholders has rejected the 10 bids for the proposed bridge over Baird avenue, Cooper's Creek. The bids received were as follows: Variety Iron Bridge Company, $33,000; North Penn Bridge Company, $31,000; Dean Westbrook Bridge Company, $33,000; Oswego Bridge Company, $33,050; Wynkoop Bridge Company, $30,950; Penn Bridge Company, $34,000; Canton Bridge Company, $33,500; Berlin Construction Company, $33,300; Groton Bridge Company, $31,850; Joseph H. Cutley, $32,210. The appropriation was $20,000.

The Scherzer Rolling Lift Bridge Co. has submitted plans for the proposed Federal street bridge.

CHAMBERLAIN, S. DAK.—On Jan. 15 a bill was introduced in the U. S. Senate and referred to the Committee on Commerce authorizing a bridge across the Missouri River between Chamberlain, Brule Co., S. Dak., and Lyman Co., S. Dak.

CHEBOYGAN, MICH.—The Michigan Central has petitioned the Board of Supervisors for permission to build a new bridge over Indian Creek.

CHESTER, PA.—The Pennsylvania R. R. bridge across Chester Pike at Crum Lynne will be made wider.

CHICAGO, ILL.—Isham Randolph, Chief Engineer of the Sanitary Board, in his estimate of work for 1903 and 1904, has included $1,932,423 for the new bridges to cross the Chicago River.

CINCINNATI, OHIO.—The proposed steel viaduct to take the place of the present Ida street wooden bridge on Mt. Adams, will cost $72,500 and will be 440 ft. long. There will be two truss and four girder spans and the superstructure will be supported on braced steel columns resting on masonry or concrete piers, with abutments at each end. The sidewalks will be of cement and be 6 ft. wide. The roadway will be 32 ft. wide.

DETROIT, MICH.—As a result of a conference recently held in Detroit, Mich., the Grand Trunk Ry., the Michigan Central, and Wabash Railroads have come to an agreement respecting the location of the projected bridge between Detroit and Windsor, Ont. Two Canadian charters are in existence, one controlled by the Grand Trunk, and another by the Michigan Central, but the shipping interests have hitherto prevented anything being done. Now that the differences have been arranged between the railroad companies it is not expected that the shipping interests will further oppose the erection of a bridge.

DICKSON, TENN.—The County Court of Dickson County has decided to build a bridge over Jones Creek.

GLENS FALLS, N. Y.—A covered bridge 120 ft. long across the Upper Hudson River at Glen, was swept away Jan. 14 by an ice jam.

GREENFIELD, MASS.—Plans have been made for a bridge over the B. & M. tracks at Sprut's crossing. Address T. G. Spaulding at Northampton.

FREDERICTON, N. B.—Bids are wanted Feb. 9 by the Provincial Department of Public Works for rebuilding Shepody River bridge.

FREDONIA, WIS.—Bids are wanted at once for a steel bridge 280 ft. long over Milwaukee River. Address H. F. Beger, Fredonia Station, Ozaukee County, Wis.

HARRIMAN, TENN.—About $100,000 will be spent in building three bridges in the county. The funds have been voted by the Commissioners.

HARRISBURG, PA.—The court has confirmed the recommendation of viewers for a bridge over Little Niconisco Creek in Upper Paxton Township.

The Board of Public Buildings and Grounds has given the contract to build a single span steel bridge, about 225 ft. long, over the Chenango River at Pulaski, Lawrence County, to Nelson & Buchanan, Chambersburg, Pa., at $34,900. The other bids were: Bellefontaine Bridge & Iron Co., $43,500; J. A. Westbrook, $38,905; W. H. Gulick, $38,500; Canton Bridge Co., $40,200; King Iron Bridge Co., $39,000; F. R. Long Co., $41,700; National Bridge Co., $39,990; Wynkoop & Biary, $41,000; Berlin Construction Co., $39,000; York Bridge Co., $40,600; Penn Bridge Co., $37,000; H. Williams, $36,970; Variety Iron Works, $38,000; Rochester Bridge Co., $40,000.

The new bridge to be built across the Susquehanna River between Maclay street and West Fairview will be about 4,400 ft. long and will cost about $150,000. It will be a steel structure, and will be built to accommodate a trolley track. A contract is to be let in the spring. (Jan. 16, page 53.)

HOOSICK FALLS, N. Y.—Plans have been made to eliminate the grade crossing at River street and the Railroad Commissioners are asked to approve them. The cost will be over $30,000. G. E. Baltimore, of Troy, made the plans.

INDIANAPOLIS, IND.—Plans have been made for a stone bridge, a concrete bridge and a steel girder bridge for the proposed crossing of Fall Creek at College avenue. The appropriation for this structure was increased to $80,000 some months ago, but the money was not available until now.

JOHNSON CITY, TENN.—The City Council is advertising for bids for a bridge over Brush Creek on West Main street.

KANSAS CITY, MO.—A satisfactory arrangement, we

are told, has been made with the Metropolitan Street Railway Co. by the Kansas City Belt Line, for building the Summit street viaduct, and it is quite probable that either of these companies will ask bids within the next week or so.

KNOXVILLE, TENN.—The plans for rebuilding and strengthening the bridges of the Southern not only applies to the Knoxville & Ohio Railroad but is to apply to the main line of the Southern between Knoxville and Bristol. It is stated that the contracts for new bridges and abutments have not been let, but it is expected that they will be in a short time.

The Southern Ry. expects to spend about $1,000,000 on improvements on the branches around Knoxville. This work will include many new steel bridges, reduction of grades, etc.

MILLEDGEVILLE, GA.—A bill is before Congress for a bridge over Oconee River in Georgia by the Wadley & Mt. Vernon Ry.

NEWARK, N. J.—The Freeholders of Essex County and the Town Council of Harrison are considering building a bridge over the Passaic from Center street, Newark, to Middlesex street, Harrison. R. P. Walsh, Town Clerk, Harrison.

NEW HAVEN, CONN.—The city officers of New Haven and of Westhaven are notified that the Secretary of War has signed the petition for a new raised stationary bridge over the West River at Kimberly avenue, thus ending a controversy of 10 years. Many favored a draw bridge, claiming the river was navigable. Secretary Root made a personal investigation about a month ago. The bridge will cost about $25,000. C. W. Kelly, City Engineer.

NEW YORK, N. Y.—Bridge Commissioner Lindenthal has approved the plans of Henry H. Hornbostel for the new Blackwell's Island bridge over the East River and has submitted them to the Municipal Art Commission for their consideration and approval. The new bridge will be a cantilever, and will be 7,449 ft. long. It will be 135 ft. above high water. There will be a roadway in the center 36 ft. wide, allowing three teams to move in one direction abreast. There will be four trolley tracks. The bridge will be a double decker, and on the upper deck will be two elevated tracks and two promenades.

PENNSYLVANIA.—The Commissioners of Washington and Westmoreland Counties are considering the matter of building a joint bridge over the Monongahela River, and have a bill before Congress for that purpose. Hugh Henderson is clerk to the Board of Commissioners of Westmoreland County. His address is Greensburg, Pa.

PHILADELPHIA, PA.—The Department of Public Works estimates that the sum of $208,000 is needed to place the city bridges in proper repair.

Plans for the Philadelphia Rapid Transit Company's Market street bridge across the Schuylkill have been submitted to the War Department for approval. Similar plans for a crossing of the tracks of the Baltimore & Ohio have been sent to that company. When approved, they will be submitted to the War Department. John B. Parsons, President of the Rapid Transit Co., says the work will be done as rapidly as possible. It is to be begun as soon as the frost is out of the ground. It is said that contracts will be let soon.

PITTSBURGH, PA.—Plans have been made by the Bessemer & Lake Erie for a steel viaduct to replace the wooden structure upon which Hulton road crosses its main line tracks.

POCATELLO, IDAHO.—A bridge is proposed over Snake River in the vicinity of American Falls. Funds are being collected by private subscription in Oneida and Blaine Counties.

PORTLAND, MICH.—It is said that the Board of Supervisors has consented to build a bridge over Grand River on the town line between Portland and Danby.

ROCHESTER, N. Y.—The bridge over the Erie Canal at Allen street may be replaced by a new bridge at a cost of $30,000.

Two bills have been introduced in the Legislature providing for new canal bridges at South Washington street and Lyell avenue, to cost $25,000 and $40,000 respectively. The Lyell avenue bridge will be a lift bridge, while the Washington street bridge will be stationary.

ST. LOUIS, MO.—It is generally understood that the third bridge over the Mississippi River at St. Louis is now to be built by the Terminal Railway Association. Congress authorized this bridge to be built from Mullanphy street, St. Louis. The cost will reach about $15,000,000. The Third Bridge Company has as directors D. C. Van Blarcom, Vice-President of the National Bank of Commerce, St. Louis, and Mayor M. M. Stevens, of East St. Louis.

The Terminal Association will also build an elevated road to Forest Park.

The Terminal Association also has plans made for widening the east approach to Eads bridge, which will require some steel work.

SALEM, MASS.—The city is considering bridging Bass River.

SAN FRANCISCO, CAL.—The Southern Pacific will use 27,000 tons of steel in bridge work during this year. Definite plans are not yet completed, but the new spans will be put in between Sacramento and Salt Lake, Santa Barbara and Los Angeles and Houston, Texas and Los Angeles.

SCRANTON, PA.—The following bids were received by J. E. Roche, of the Public Works Department, on Jan. 12, for the Lackawanna avenue viaduct, for which the contract was let to Burke Bros., Scranton, Pa., at $57,625; Cement Paving & Construction Co., Jersey City, N. J., $60,196; Edwin S. Williams, Scranton, Pa., $64,737; Peter Stipp, Scranton, Pa., $69,000; Wynkoop & Brady Co., New York, $69,840; Nelson & Buchanan Co., Chambersburg, Pa., $87,496.

SPOKANE, WASH.—Plans for the new approach to Monroe street bridge have been made by City Engineer A. F. Gill. This work is to cost about $30,000.

SYRACUSE, N. Y.—The contract for building the bridge over the Oswego Canal at Butternut street has been let to the Groton Bridge Co. at $17,829.30.

TOWANDA, PA.—The following bids were received by the County Commissioners for building the highway bridge across Susquehanna River at Sayre, Bradford County, the work including 1,060 yds. concrete masonry, three camelback, Pratt truss spans 230 ft. each, 18 ft. roadway.

Bidder.	Substructure.	Superstructure.	Both.
Louis Plolett, Wysox, Pa.	$9,540	...	...
Whalen Bros., Towanda, Pa.	8,480	...	...
D. A. Keefe, Athens, Pa.	8,400	$41,890	$50,390
T. Wilson, Towanda, Pa.	8,000	...	...
H. Rebius, Mauch Chunk, Pa.	7,950	...	...
National Bridge Co., New York, N.Y.	...	...	42,700
York Bridge Co., York, Pa.	...	...	50,990
King Bridge Co., Cleveland, O.	...	32,477	41,448
Illinois Bridge Co., Chicago, Ill.	...	32,900	...
Penn Bridge Co., Beaver Falls, Pa.	...	35,000	...
Owego Bridge Co., Owego, N. Y.	...	...	42,700
Canton Bridge Co., Canton, O.	...	39,790	...
F. R. Long, New York	...	...	47,000
Variety Iron Wks., Cleveland, O.	...	32,890	40,000
Nelson & Buchanan, Ch'mb'rsb'g, Pa.	...	...	45,697
Wynkoop, Brawley & Lane, New York	...	31,999	...

Contract for substructure let to T. Wilson, Towanda, Pa., for $7,950, by consent of H. Rebius, the lowest bidder. Contract for superstructure let to Wynkoop, Brawley & Lane, New York, for $31,999. Total cost of bridge, $39,949.

WASHINGTON, D. C.—The plans for the highway bridge over the Potomac have been approved by the Secretary of War. A brief description of the structure is given in another column.

Other Structures.

ABBEVILLE, S. C.—Fire destroyed the tin and boiler shops of the Seaboard Air Line, Jan. 10.

ALIQUIPPA, PA.—The Vulcan Crucible Steel Co. (office, Pittsburgh) is considering plans for the doubling of its present crucible furnaces by adding a new floor with 30 additional pots during the coming spring. The company is now completing its new open hearth plant at Aliquippa and will have that plant, as well as new rolling mills and new hammers, in operation by March 1.

ALLOUEZ, WIS.—The Great Northern will build a 12-stall engine house here of brick and steel.

ANNISTON, ALA.—The Southern Car & Foundry Co., with works at Gadsden and Anniston, Ala., and Memphis and Lenoir City, Tenn., is making arrangements to have the Jupiter furnace removed from St. Louis to Alabama, where it will be rebuilt with all modern improvements. When rebuilt the furnace will be 99 ft. high and 20 ft. bosh, making it the largest furnace in the South.

BIRMINGHAM, ALA.—Don H. Bacon, President of the Tennessee Coal & Iron Company, announces that his company will erect a new blast furnace at Ensley, the work to begin immediately. As soon as this work is under way, four or five of the present furnaces will be replaced by larger ones. The cost is estimated at between $400,000 and $500,000.

EDGEWOOD, PA.—Bids are asked by the Pennsylvania for a station here. Total cost, $10,000.

HUDSON, N. Y.—The New York Central proposes to build a new freight station in Hudson.

IRWIN, PA.—The Penn Gas Coal Co., of Irwin, has decided to move its car shops from Penn station to this town. The car shops of Penn have been in operation for about 30 years and the plant is too small for present demands. The new car shops will be double the present capacity.

KANSAS CITY, KAN.—An ordinance is being prepared for the Kansas City Outer Belt & Electric Ry. The ordinance will provide that whenever the city builds suitable approaches to the company's bridge it will be made free for wagons and pedestrians. The company also agrees to build a large depot at a cost of $25,000.

LOUISVILLE, KY.—The Louisville Railway will spend $1,000,000 this year in building interurban lines and in other improvements. An addition will likely be added to the power house at a cost of $300,000, and about 50 to 100 new and modern cars will be ordered, a part of them being already under construction. The money will be raised by selling new stock at par, in all probability.

MALONE, N. Y.—That the Rutland Railroad shops will remain in Malone seems at last to be settled. It is now announced that $50,000 will be at once spent in enlarging and improving the present plant.

MONTREAL, QUE.—Peck, Benny & Co.'s nail mill on the Lachine Canal bank was burned Jan. 19. The loss is $25,000.

NEW YORK, N. Y.—Proposals will be received by W. J. Wilgus, Chief Eng., New York Central, 3 p.m., January 26, for the construction of a bulkhead pile platform, the strengthening of the present pier at shed column supports, and erecting and covering a steel frame pier and bulkhead shed with galvanized iron, all situated at Pier (new) 34, foot of Rutgers street slip, East River, New York City.

NORWAY, MICH.—The Wisconsin & Michigan roads will let the contracts in a few weeks for a new depot to be built at Norway, also one at Vulcan and possibly one at Quinnesec.

OAKLAND, CAL.—The Southern Pacific announces the possibility of erecting a new station somewhere in this city during 1903.

OKLAHOMA CITY, OKLA.—Work has been begun on the new shops for the Missouri, Kansas & Oklahoma. Contracts for two stations, tanks and roundhouse are to be let soon, according to report.

PHILADELPHIA, PA.—The Pennsylvania has awarded to Millard & McGrane the contract to build a $20,000 office and freight station on the east side of Broad street, south of Clearfield street, Germantown Junction. The building will be two stories high and will measure 58.5 by 229.4 ft.

PITTSBURGH, PA.—The George A. Hogg Iron & Steel Foundry Co., of Pittsburgh, manufacturers of engines and rolling mill machinery, is considering the advisability of abandoning its machine shop and foundry now located at 24th and Railroad streets, Pittsburgh, and building an entirely new plant outside of Pittsburgh but within a few miles of the city. If the change is made, buildings of brick and steel will be erected and the most modern machinery installed.

SAN FRANCISCO, CAL.—The Southern Pacific is removing the burned piling from the ruins of the Alameda mole depot, destroyed by fire in November last. Plans for the new depot are not completed, but it is officially announced that it will be a spacious building and equipped with upper and lower aprons for the double deck bay ferry boats. It will be similar to the arrangement of the terminal depot at Oakland Pier.

TRENTON, N. J.—Bids will be wanted early in the spring by the De Laval Steam Turbine Co. for additions to the plant.

WEST POINT, N. Y.—The Secretary of War has authorized the Superintendent of the Military Academy to invite 10 representative architects of the country to submit competitive designs by May 15 for the general plan of improvements to be made at West Point under the appropriation made by Congress last session. Lieut. Gen. John M. Scofield, and Messrs. George B. Post, Walter Cook and Cass Gilbert, with Col. A. L. Mills, Supt. of the Military Academy, have been asked by the Secretary of War to form a jury to advise him in the selection of the best plan.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvi.)

Pacific Coast Railway Club.

An illustrated paper by J. R. Van Cleve, Master Mechanic of the White Pass & Yukon Railway, was read at the meeting on Dec. 20.

American Railway Superintendents of Bridges and Buildings.

The 1903 meeting will be held at Quebec, Canada, the third Tuesday in October (20th). S. F. Patterson, Secretary, Concord, N. H.

Western Society of Engineers.

The annual meeting was held at Chicago Jan. 6, and these officers elected: President, Ralph Modjeska; First Vice-President, H. W. Parkhurst; Second Vice-President, F. E. Turneaure; Treasurer, Andrews Allen; Trustee, B. E. Grant.

Railway Club of Pittsburgh.

The regular meeting of this club will be held at Hotel Henry, Pittsburgh, Pa., at 8 o'clock p.m., Friday, Jan. 23. The subject presented and for discussion is "First Aid for the Injured," by Dr. J. D. Milligan, Chief Surgeon P. & L. E. R. R. Co.

Engineers' Club of St. Louis.

The following are the officers for the coming year: President, J. L. Van Ornum; Vice-President, J. A. Ockerson; Secretary, H. J. Pfeifer; Treasurer, E. E. Wall. Messrs. E. R. Fish and F. E. Bausch were elected as members of the Board of Managers of the Association of Engineering Societies, of which this club is a member.

The Rocky Mountain Railway Club.

At the December meeting discussion was held on "Rate Making and Its Causes." The topic was opened by a paper by C. L. Wellington, of the Colorado & Southern.

A paper on "The Relation of the Effects of Heavy Wheel Loads on Track to the Reduced Cost of Moving Traffic" was read by Hugh Wilson, Trainmaster, B. & M. R. R.

At the meeting Saturday evening, Jan. 17, a paper on the "Effect of Heavy Equipment on Roadway Maintenance" (published in December number), by Mr. Hugh Wilson, of the Burlington, was presented and discussed.

Western Railway Club.

At the January meeting of this club, which will be held on Tuesday, the 20th inst., in the Auditorium Hotel, Chicago, two papers postponed from the December meeting will be presented. They are: "Average Freight Car Lading and Tons Lading of Freight Trains," by Mr. J. D. McPartland, Assistant Superintendent of the Chicago, Burlington & Quincy, Burlington, Ia., and "The Supply Car," by Mr. J. P. Murphy, General Storekeeper, Lake Shore & Michigan Southern R. R., Collinwood, O. There will also be a paper on "Modern Car Shops," by Mr. W. E. Sharp, Superintendent Armour Car Lines, Chicago.

American Institute of Mining Engineers.

The annual meeting will be held at Albany, N. Y., beginning Feb. 17. The programme will include the following papers: "The Determination of the Power Required for Rolling Iron," by L. Katona, of Resicza, Hungary; "Electric Power Transmission for Mining Purposes," by F. O. Blackwell, of Schenectady, N. Y.; "Electricity in Coal Mining," by W. B. Clark, of Schenectady, N. Y.; "Flue Dirt and the Influences Controlling It," by F. L. Grammer, of Baltimore, Md.; "Electric Lead Refining," by A. G. Betts, of Troy, N. Y.; "Notes on the Metallurgy of Copper in Montana," by H. O. Hofman, of Boston, Mass.; "The Mineral Resources of Alaska," by A. H. Brooks, of the U. S. Geological Survey, Washington, D. C.; "A Cyanide Solution Test for Precious Metal Contents," by A. Arents, of Alameda, Cal. A trip will be made to the works of the American Locomotive Co., and the General Electric Co., at Schenectady. Theodore Dwight, Acting Secretary, New York.

Michigan Engineering Society.

The annual meeting will be held at Battle Creek, Jan. 20, 21 and 22. Part of the programme is: President's address, Prof. M. E. Cooley; Naval Architecture and Marine Engineering at the University of Michigan, by Prof. H. C. Sadler; The Engineer and the Patent Office, by G. B. Wilcox; Some Cases of Lost Corners, by B. F. Dorr; Apportionment of Cost in the Subdivision of Sections by the County Surveyor, by D. A. Brotherton; Plant Used in Deepening the Channels of the Great Lakes, by H. Hodgman; Value of Momentum Grades, by J. J. Hubbell; Method for Finding Latitude, Local Time and Meridian, by N. B. Kellogg; Automatic Register for Indicating the Stage of Water, by C. Y. Dixon; More About the St. Clair Flats Survey, by Prof. J. B. Davis; Water-Works Experiences, by A. L. Holmes; Forestry, by F. E. Skeels; Some Debatable Points in Masonry, and Best Form of Rail for Street Railroads, by E. W. Muenscher; Notes of Litigation on the Title of a Mexican Land Grant in California, by C. A. Ensign; Some Questions in Land Surveying, by F. Hodgman; Sewage Disposal, by W. S. Shields; Power Tests of Steam and Electric Railroad, by Prof. J. R. Allen; Tests of Automobile Engines, by H. C. Anderson; Concrete-Steel Sewer Construction, by G. S. Pierson. F. Hodgman, Secretary, Climax, Mich.

PERSONAL.

—Mr. C. A. Vermillion, Division Superintendent of the Missouri Pacific, was born in 1860 and commenced his railroad service in 1876. He was operator, agent and despatcher on various western roads until 1889, since which time he has been despatcher and chief despatcher on the Missouri Pacific at Atchison, Weeping Water and Omaha.

—Lieutenant Frank W. Hibbs, Naval Constructor U. S. Navy, has resigned to take effect at once, in order to accept a position with a shipbuilding company at Seattle, Wash. Lieutenant Hibbs was born in Pennsylvania and appointed to the Navy from Minnesota Sept. 4, 1883. He was promoted to be a Naval Constructor Nov. 11, 1897, and since October, 1900, he has been in charge of construction and repair work at the Navy Yard, Puget Sound.

—Hon. John H. Reagan, for the last 12 years Chairman of the Texas State Railroad Commission, has retired to private life, after holding public office contin-

uously for 64 years. Judge Reagan is 85 years old; and, as our readers know, was one of the principal figures in the movement in Congress, previous to 1887, for a Federal law regulating railroads; and he has been at the head of the Texas State Commission from its first organization. He is the only surviving member of the cabinet of Jefferson Davis.

—Mr. A. F. Hockenbeamer, recently appointed Assistant to the General Superintendent of Motive Power of the Baltimore & Ohio Railroad, was born in Logansport, Ind., in 1871. Mr. Hockenbeamer was in the service of the Pennsylvania Company for 15 years as Maintenance of Way Accountant, chief clerk to Engineer of Maintenance of Way and to the Superintendent. From January, 1902, to January, 1903, when he became Assistant to the General Superintendent of Motive Power of the Baltimore & Ohio, he was Chief Maintenance of Way Accountant of the latter company.

—Mr. M. F. Dunn, who has just become Superintendent of the Maine Central, was born in Boston, April 2, 1864, and entered the employ of the European & North American Railway Company as an operator in 1882. In October of that year this road was leased to the Maine Central and two years later Mr. Dunn was transferred to Portland, Me., as assistant train despatcher. In 1896 he was appointed chief despatcher on the Eastern Division of the Maine Central, and in May last was appointed Acting Superintendent of the same division, and on Dec. 23 last the appointment was made permanent.

—Mr. G. A. Richardson, who on Jan. 7, was elected Assistant to the President and Secretary of the Erie Railroad, began his railroad service as a clerk on the Cincinnati, Hamilton & Dayton in 1878. From then until 1898 he held subordinate positions with different roads. In the latter year (1898) he was appointed Assistant Superintendent of the Baltimore & Ohio, and in 1900 was assigned to special duty on the staff of the Second Vice-President and General Manager, with the title of Superintendent. The next year (1901) he was made Assistant to the President (unofficially) of the Erie Railroad, which position he held until his new appointment as above.

—Mr. John Krey, Division Engineer of the New York Central & Hudson River Railroad, is 45 years old. He was born in Germany and was educated in that country and in England. He has had a varied experience as an engineer, having served on the Natal Government railroads and in other public works in South Africa and on the German Government railroads. His American railroad service began on the Chesapeake, Ohio & Southwestern. He was Assistant Engineer for a number of years on the Duluth & Iron Range and had a long experience on other work in the Lake Superior region, including Government municipal engineering. He came to the New York Central about four months ago and was appointed Division Engineer on Jan. 1.

—The new Engineer of Bridges of the Canadian Pacific at Montreal, Mr. C. N. Monsarrat, is a native of that city, having been born in Montreal in 1871. His railroad service dates from 1889, when he began as structural draftsman in the office of the Chief Engineer of the Canadian Pacific. In June, 1896, he was appointed inspector of steel bridges, and from 1897 to 1901 he was Engineer in charge of erection and designing of many important structures in British Columbia and elsewhere. On Dec. 1, 1901, he was made Assistant Engineer at Montreal, from which position he has just been appointed as above. Mr. Monsarrat is a nephew of President Monsarrat, of the Hocking Valley Railroad, and is an associate member of the Canadian Society of Civil Engineers.

—Mr. Tunis Isbester, 58 years old, and for some time the western representative of the Westinghouse Air-Brake Company, died at his home in Evanston, Ill., on Jan. 15. He was born at Kinderhook, N. Y. Mr. Isbester was for several years connected with the New York Central & Hudson River, and later represented the Star Headlight Company of Rochester. Then for some time he was with the New York Air-Brake Company, being located at Chicago. He has been with the Westinghouse Air-Brake Company for about four years, as sales agent of the Westinghouse friction draft gear and as western representative. Mr. Isbester was a man of some extraordinary qualities for commercial life. He had a commanding physique, was dignified and yet cordial in manner, and was thoroughly trusted by those who knew him well. He had done much to put his calling on a high plane.

—Mr. Charles S. Churchill, whose title has been changed from Engineer of Maintenance of Way to Chief Engineer of the Norfolk & Western, is 47 years old and was born at New Britain, Conn. Mr. Churchill is a graduate of Yale University (Sheffield Scientific School). He entered railroad service in 1879 and was for one year engaged on surveying projected railroads in Connecticut. For three years (1881-1884) he was Division Engineer for the Pittsburgh, McKeesport & Youghiogheny, and for the three years following was Principal Assistant Engineer on construction for the Pennsylvania Railroad. During the year 1887-1888 he was Engineer of Maintenance of Way of the Shenandoah Valley, and in May of the latter year went to the Norfolk & Western as an Engineer, becoming Engineer of Maintenance of Way the following October. Mr. Churchill is a member of the American Society of Civil Engineers; the Engineers Club of Philadelphia; the American Society for Testing Materials, and the American Railway Engineering and Maintenance of Way Association.

—Professor Estevan Antonio Fuertes died at his home on the campus of Cornell University, at Ithaca, N. Y., on the morning of Jan. 16. He had been at the head of the Civil Engineering faculty of Cornell University since 1873, when that department was established, and in recent years had been not only the Dean of the Civil Engineering faculty but Director of the College of Civil Engineering. He was a remarkable man. On his father's side his blood was Spanish, German and Polish, and on his mother's side French Huguenot and North Irish. His boyhood and early manhood were spent in Porto Rico, where he was born. He had traveled much in various lands. He had received a liberal education in the arts and a severe scientific education, and had passed most of his life in a refined and intellectual atmosphere. The result of all of these elements and conditions was a man of charming manners, of a variety of tastes and accomplishments and of great attainments, and thus he was calculated to attract, interest, and influence the people with whom he was brought in contact, and particularly the young men. He was born in San Juan, Porto Rico, May 10, 1838. He was carefully educated and received two Doctor's degrees, as well as several minor degrees. He then took the course in Civil Engineering at Rensselaer Polytechnic Institute, where he was graduated. He did responsible work in Porto

Rico as Director of Public Works for the Western District, the disbursements of his department having amounted to over three millions of dollars while he was in charge. He designed and built canals, buildings and bridges, and in 1863 he blew up a rock promontory on a military road, using a blast of over 11 tons of gun powder. This was one of the earliest blasts ever fired by electricity, and probably the largest one up to that time. About 1864 he went to New York City, where he was employed by the Croton Aqueduct Board, and where he afterward opened an office as consulting engineer. In 1871 he was appointed by the War Department of the United States as Chief Engineer of a government expedition to Tehuantepec and Nicaragua, making surveys for a ship canal. On his return he resumed his practice in New York, but in 1873 was appointed to the chair of Civil Engineering at Cornell University, where he remained in active work until November 8 last, when he resigned because of failing health. In the course of that time he made many studies and reports for enterprises in the United States and in South America and published many articles in literary and scientific journals. He had received a good deal of recognition in the way of medals and decorations, and was a member of numerous learned societies. He had been a member of the American Society of Civil Engineers since February, 1869, and served once on the Board of Directors of that Society.

ELECTIONS AND APPOINTMENTS.

Arkansas State Railroad Commission.—The Railroad Commission of Arkansas has organized by the election of the following officers and employees: Chairman, B. B. Hudgins, of Boone County, the other members being J. E. Hampton, of Fordyce, and J. W. Phillips, of Newport. Secretary, W. E. Floyd, of Little Rock, to succeed Howard Robb, of Arkansas City. Expert Rate Clerk, E. K. Connelly, resigned.

Baltimore & Harrisburg.—W. H. Lanius has been elected President.

Baltimore & Ohio Southwestern.—J. G. Neuffer, heretofore General Master Mechanic, has been appointed Superintendent of Motive Power, and the position formerly held by Mr. Neuffer has been abolished.

Bearden & Ouachita River.—H. C. Homeyer, General Auditor, will also assume the duties formerly discharged by M. M. Riner, who has resigned. Mr. Riner was General Freight Agent.

Brunswick & Birmingham.—W. A. Slocum has been appointed Superintendent of Transportation, with headquarters at Brunswick, Ga.

Canadian Pacific.—F. W. Peters has been appointed Assistant Freight Traffic Manager, in charge of western lines, with headquarters at Winnipeg, Man.

Central New England.—J. B. Robins has been appointed Car Accountant, with headquarters at Hartford, Conn., succeeding J. R. Doran, resigned, effective Jan. 19.

Central of Georgia.—C. L. Bruner, heretofore Trainmaster, has been appointed Superintendent of the Second Division, with headquarters at Macon, Ga., succeeding the late Mr. Epperson.

Charleston, Clendennin & Sutton.—H. G. Davis has been elected President, succeeding T. H. Given. A. Lee has been elected Secretary, and C. M. Hendley, Treasurer.

Chicago, Rock Island & Pacific.—J. F. Holden, heretofore Assistant Freight Traffic Manager, has been appointed Freight Traffic Manager in charge of the freight on all the lines in the system. The jurisdiction of Passenger Traffic Manager John Sebastian is extended over the Choctaw, Oklahoma & Gulf, and the St. Louis, Kansas City & Colorado. J. M. Johnson, who has been Third Vice-President and Freight Traffic Manager, drops the latter title, but continues as Third Vice-President.

Chicago, Rock Island & Texas.—F. E. Dietrich has been appointed Acting Auditor, with headquarters at Fort Worth, Texas, succeeding H. Morris, assigned to other duties.

Chihuahua & Pacific.—C. L. Graves has been appointed General Manager, with headquarters at Chihuahua, Mex.

Choctaw, Oklahoma & Gulf.—See Chicago, Rock Island & Pacific.

Columbia Southern.—E. D. Woodbury has been appointed Superintendent, with headquarters at Shaniko, Ore., succeeding D. J. Harris, resigned.

Colorado & Southern.—Frank W. Egan, heretofore General Superintendent of the Denver & Rio Grande, has been appointed General Superintendent of the C. & S., with headquarters at Denver, Colo., succeeding Chas. Dyer, resigned, effective Jan. 20. The office of Superintendent Car Service has been abolished and R. F. Watkins has been appointed Car Accountant at Denver, effective Jan. 20.

G. F. Cotter has been appointed Superintendent, with headquarters at Trinidad, Colo., succeeding S. L. Rainey, resigned.

Darien & Western.—J. S. Lane, General Manager, having resigned, the duties of that office will be assumed by President F. H. MacFarland.

Denver & Rio Grande.—I. H. Luke has been appointed Superintendent of the Second and Third Division, with headquarters at Salida, Colo., succeeding F. R. Rockwell.

W. Coughlin, heretofore Superintendent of the Kansas City Southern, has been appointed General Superintendent of the D. & R. G., with headquarters at Denver, succeeding F. W. Egan. (See Colorado & Southern.)

Duluth, Missabe & Northern.—E. B. Ryan, Jr., has been elected Secretary, succeeding M. A. Carroll.

Great Northern.—George H. Emerson, heretofore General Master Mechanic of the Western District, has been appointed Superintendent of Motive Power, with headquarters at St. Paul, Minn. A. E. Long, heretofore Acting Division Superintendent, has been appointed Division Superintendent.

Indiana, Illinois & Iowa.—F. G. Hopper has been appointed General Freight and Passenger Agent, and W. H. Ward has been appointed to succeed Mr. Hopper as Assistant General Freight Agent. G. H. Ross, Traffic Manager, with headquarters at Chicago, Ill., has resigned.

Iowa State Railroad Commission.—D. J. Palmer has been elected Chairman of the Board to succeed E. A. Dawson, whose term expires.

Jamestown, Chautauqua & Lake Erie.—R. J. Bootey, General Superintendent, and O. W. Kelsey, Auditor, have resigned. The former position has been abolished.

Kanona & Prattsburgh.—On Dec. 31, L. V. F. Randolph, President; I. W. Fowler, Vice-President and Treasurer, and John J. Cahill, Secretary, resigned and on the same date General Brayton Ives and Benjamin Strong, Jr., were elected President and Secretary and Treasurer, respectively.

Kansas City Southern.—See Denver & Rio Grande.

Long Island.—The headquarters of A. B. Bierck, Auditor; H. M. Smith, General Passenger Agent, and W. J. Rose, General Freight Agent, have been removed from Long Island City to New York city.

Moshassuck Valley.—Douglas C. Paton has been appointed General Superintendent, with headquarters at Saylesville, R. I., succeeding Alfred H. Aldrich, resigned.

Mexican Northern.—V. P. Safford has been appointed Manager.

Missouri Pacific.—W. V. Powell has been appointed Right-of-way Agent, with headquarters at St. Louis, Mo.

Missouri Railroad & Warehouse Commission.—W. E. McCully has been elected Chairman of the Board, and T. M. Bradbury, Secretary. J. A. Knox succeeds T. J. Hennessey as Commissioner.

National of Mexico.—See National of Tehuantepec.

National of Tehuantepec.—W. B. Ryan, heretofore General Freight and Passenger Agent of the National of Mexico, has been appointed General Traffic Manager of the N. of T., with headquarters at Mexico, succeeding the late J. J. Allen.

Norfolk & Western.—The headquarters of W. G. Macdowell, Treasurer, will on Feb. 1 be removed from Roanoke, Va., to Philadelphia, Pa.

North Shore.—W. M. Rank, heretofore Assistant General Manager, has been appointed General Manager.

Orford Mountain.—A. C. Lytle has been appointed Superintendent, with headquarters at Eastman, Que., relieving H. C. Cleveland to this extent.

Ozark & Cherokee Central.—J. C. Duffin has been elected Secretary, succeeding A. M. Cooper, resigned. H. K. Wade becomes Treasurer and J. Stewart succeeds W. P. Dewar as Auditor. P. Talbot has been appointed General Freight and Passenger Agent, with headquarters at Fayetteville, Ark.

Rio Grande Southern.—R. Patterson has been appointed Master Mechanic, with headquarters at Ridgway, Colo., succeeding J. Schlacks, resigned.

St. Louis & Gulf.—F. E. Dewey has been appointed General Superintendent, with headquarters at Cape Girardeau, Mo.

St. Louis, Kansas City & Colorado.—See Chicago, Rock Island & Pacific.

St. Louis, Keokuk & Northwestern.—C. A. How has been appointed Superintendent, with headquarters at Hannibal, Mo.

South Carolina State Railroad Commission.—C. W. Garris has been elected Chairman of the Board, succeeding J. C. Wilborn, whose term expires.

Western Maryland.—S. M. Manifold, heretofore Division Superintendent, has been appointed General Superintendent, with headquarters at Hillen Station, Baltimore, Md. H. R. Pratt has been appointed Engineer of Maintenance of Way, with headquarters at Baltimore. C. O. Vandevanter, having resigned as Resident Engineer, J. W. Galbreath has been appointed Principal Assistant Engineer, in charge of the construction of the Tidewater Line, with headquarters at Baltimore.

Wichita Valley.—W. F. Sterley has been appointed General Freight Agent and A. A. Glisson, General Passenger Agent, with headquarters at Ft. Worth, Texas, succeeding D. B. Keeler, previously General Freight and Passenger Agent, resigned.

Wiggins Ferry Company.—S. M. Dolan, Master Mechanic, with headquarters at St. Louis, Mo., has resigned.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALASKAN ROADS.—It is reported that the White Pass & Yukon have completed surveys for a 20-mile extension

in Alaska from Skagway to Summit. A seven-mile extension from Nome to Anvil Creek is reported projected by the Wild Goose Mining Co.

Arizona & Colorado.—Contract for building this road from Cochise to Naco, Ariz., has been let to R. R. Coleman, of Prescott, Ariz. This company is a part of the Cananea, Yaqui River & Pacific. G. H. Pillsbury, Edgar Buehring and W. C. Green, of Los Angeles, are interested.

Big Sandy & Brucetown.—Charter was granted this company in West Virginia on Jan. 12. It proposes to build from the mouth of Big Sandy Creek to Brucetown, Preston County, W. Va., a distance of about 110 miles. F. C. Keibly, James R. Barnes, of Uniontown, Pa., and Herbert C. Greer, of New Castle, Pa., are interested.

Big Sandy, East Lynne & Guyan.—Contract for grading this line from Wayne, W. Va., to the East Lynne coal mines, eight miles, has been let to Ingles & Simpson, Radford, Va. J. W. Lockhart, Wayne, W. Va., is the engineer in charge.

Birmingham & Atlantic.—(See Seaboard Air Line, Railroad News.)

Brunswick & Birmingham.—Grading is reported completed between Douglas and Ocilla, Ga., 25 miles. Trains will probably be running between these two points by April 1, 1903.

Canadian Pacific.—An officer denies the report that work will be done by this company west of Moosejaw, and also that an extension will be built from Church Bridge to Pheasant Hill.

Carthage.—It is officially stated that the extension from Carthage, N. C., to Greensboro, 55 miles, which was under consideration in 1902, has been abandoned for the present.

Chambersburg, Green Castle & Waynesboro.—The directors of this company have recently authorized an extension of this road from Green Castle to Pen Mar, 14 miles. The capital stock will be increased from $120,000 to $300,000 for this purpose.

Charlotte, Monroe & Columbia.—Grading is reported in progress on the 11 mile extension of this road from Hamburg, S. C., to Jefferson. A further extension to Monroe, 25 miles, is projected. W. Montcure, Raleigh, N. C., is President.

Cheat Valley.—An extension of this road from Whetsell to Albrightsville, seven miles, is under survey. Work will probably be begun soon. H. L. Humphrey, Chief Engineer, 1001 Harrison Building, Philadelphia.

Cincinnati, Georgetown & Portsmouth.—It is reported that an extension from Georgetown to West Union, Ohio, a distance of 20 miles, is about to be built. Surveys have been made and rights of way secured. A spur of nine miles to Felicity is projected.

Curwensville-Bells Landing.—Press reports state that a road is projected between these two points in Pennsylvania, a distance of 12 miles. Rights of way are reported secured but names of interested parties are not stated.

Eldorado & Bastrop (Missouri Pacific).—An officer writes that a road is being built from a point on the State line of Arkansas and Louisiana, via Lapile, to Eldorado, 44 miles. Dodson & Sons are the contractors. Seven and one-half miles from the State line to Ouachita River have been completed, and the remaining 36½ miles from Ouachita River to Eldorado are already graded.

Fayetteville & Albemarle.—This line is projected from Fayetteville, N. C., via Southern Pines and Craigrownie to Albemarle, a distance of 80 miles. Eight miles from Craigrownie to Capels Mills, and seven and one-half miles from Southern Pines to McCrimmons, have been graded and track laying will begin in a few weeks. A. C. Wilcox, 55 Liberty street, New York, is President, and Clark J. Brown, Secretary.

Fort Wayne & Springfield.—This company has been incorporated in Ohio to build between Fort Wayne, Ind., and Springfield, Ohio, about 100 miles. J. H. Koenig, Henry J. Hoppel and C. Voght, of Springfield, are incorporators.

Great Northern.—This company has recently completed its line from Jennings, Mont., to Morrissey, B. C., nine miles south of Fernie. An extension is projected to reach Michelle, 25 miles beyond.

Illinois & Iowa.—Contract for building an extension from Clinton to Davenport, Iowa, 42 miles, has been let to Pepper & Co. The contract calls for the completion of the line by Aug. 1, 1903.

Indianapolis & Eastern.—An officer writes that this line, which extends from Indianapolis to Knightstown, Ind., 34 miles, is building to Dublin, Ind., 18 miles, via Ogden, Dunreith and Lewisville. The work is being done by the company's own forces and will probably be completed about April 1, 1903.

Kankakee & Southwestern.—This road has been sold to the Illinois Central. It runs from Otto through Kankakee and Livingstone Counties to Minonk and Normal, Ill., 65 miles, and has been operated by the Illinois Central under a lease since 1881.

Kansas City, Mexico & Orient.—It is stated that this line is proposing to build an extension from Barton, in western Oklahoma, through Hobart and Coopertown to Lawton, a total distance of about 100 miles.

Kenton & Southern (Electric).—This company has been incorporated in Ohio to build from Kenton to Bellefontaine, 25 miles. The incorporators are Richard Emory, E. E. Bartman, F. W. Merrick and others.

Louisville & Interurban (Electric).—Articles of incorporation have been filed by this company in Kentucky. It proposes to build through the Counties of Jefferson, Oldham, Shelby, Spenser, Nelson and Bullitt, all in the State of Kentucky. The incorporators are all directors of the Louisville Ry. Company. They include J. Minary, J. B. Speed, Atilla Cox, H. Bishop, John Stites, Clarence Dallam and J. W. Gaulbert, of Louisville, Ky.

Memphis, Helena & Louisiana (Missouri Pacific).—An officer writes that the following lines are under contract: Latour to McGehee, 76 miles; Halley to Clayton, 145 miles. The Grigsby-Dallhof Construction Co., of Little Rock, and McCarthy & Co., of Little Rock, are the contractors. The line from Halley to Clayton has been graded and 46 miles of track have been laid. The work will include two large bridges, one across the Arkansas and White Rivers, and one across St. Francis River.

Montana Roads.—A logging road is being built up the Blackfoot River in Bingham County, Montana, 12 miles. It will traverse a section of fine saw timber, and will probably be completed by next summer.

New York Central.—It is reported that this company is going to double-track the New York & Harlem branch, which is now a single track road between Chatham and White Plains, 25 miles from New York. This will establish a new passenger and freight route between Albany and New York of 147 miles. The regular river route is 140 miles.

New York, Ontario & Western.—An officer writes that contract for 30 miles of second track between Cadosia and Middletown has been let, and that 40 miles more will be let early in the spring. No additional lines or branches are projected for 1903.

Northern Shawmut.—This company was incorporated in New York on Jan. 14 to build from Grove, Allegheny County, to Ossian, Williamson County, 12½ miles. The directors are C. W. Artz, F. J. Ficker, H. F. Granger, of New York city; S. K. Ayers, of Jersey City, and F. W. Frost, of Brooklyn.

Ontario Roads.—Surveys have been completed for a line four miles long from Massey, on the Sault Ste. Marie branch of the Canadian Pacific in a northerly direction to copper mines. D. M. Brodie, Massey, Ont., is interested.

Paragould Southeastern.—The extension of this road from Hornersville, Mo., to Chickasawba, Ark., 16 miles, is practically completed and the line will be opened for regular business early in February. The road now runs from Paragould to Chickasawba, a distance of 51 miles. (Official.)

Pennsylvania.—Contracts for the electrical work on the Pennsylvania East River tunnel have been let to Westinghouse, Church, Kerr & Co. The architectural work will be done by McKim, Mead & White. (See our issue of Jan. 16, 1903, p. 43.)

Pennsylvania Western.—Charter was granted this company in Pennsylvania to build from Redbank Junction, in Armstrong County, to Enon in Lawrence County, 60 miles. Edward B. Taylor, Sewickley, Pa., is President. James McCrea, Joseph Wood, J. J. Turner and others, of Pittsburgh, are directors.

Pine Bluff & Western.—An officer writes that the extension from Pine Bluff to Benton, Ark., 50 miles, is completed as far as Sheridan, 25 miles. The section from Sheridan to Benton, 25 miles, is under contract to McArthur Bros., Chicago.

Pittsburgh & Allegheny.—Bids are being received by this company for a line from Apollo, on the Kiskiminetas River, through Vandergrift, Hyde Park and Leechburg, to a point opposite Tarentum, on the Allegheny River, through Valley Camp, Arnold and New Kensington to Parnassus, a total of 20 miles. This is five miles shorter than the present road. John I. Cochrane, of Pittsburgh, is President.

Pittsburgh, Shawmut & Northern.—An officer writes that a branch is now building from Clermont to Kasson, Pa., 7½ miles. About five miles have been graded. The Interior Construction & Improvement Co. are the contractors, and the Lathrop, Shea & Henwood Co. are the sub-contractors. A line is also being built from Angelica to Bolivar, 23 miles, 15 of which have been graded. This line is also under contract to both companies. Bids have been asked for the improvement in grade on the Olean branch between Main and Portville, and for a new line between Olean Junction and State Line Junction. Work is projected from Wayland north to Macedon and possibly to Lake Ontario, but no definite plans with regard to this have as yet been made.

Regina & Hudson Bay.—Application will be made to the next session of Parliament to incorporate this company to build from a point on the International boundary between the second and third meridians, to Regina, and thence through Craven in a northerly direction to Carrot River and Fort Churchill. McGiverin & Hayden, of Ottawa, Ont., are interested.

South Berwick, Eliot & York (Electric).—Contract for this road, which was incorporated in Maine in 1901 to build between the points named, 20 miles, has been let to Wm. Smith, Bangor, Me. The contract calls for the completion of the line by June 1, 1903. (Official).

Southern.—Press reports state that this company is making surveys for a line from Mooresboro to Forest City, 20 miles, passing through Henrietta, Cliffville and Caroleen, where three of the largest cotton mills in the State are located.

Southern Pacific.—Press reports state that surveys are in progress between Mountain View, Cal., and Los Gatos, 16 miles. A third rail will be laid on the narrow gage line between Los Gatos and Wrights, Cal., a distance of seven miles.

Toledo, Columbus, Springfield & Cincinnati.—An officer writes that this road, which was incorporated in Ohio in 1901, has located its entire line from Toledo, Ohio, via Lima, Bellefontaine, Peoria and Marysville to Columbus, 165 miles. The sections from Lima to Bellefontaine, 40 miles, and from Bellefontaine to Columbus, 55 miles, are under contract to the United States Construction Company. Ten miles out of Lima to Westminster are graded. Ellis Bartholomew is President, and W. P. Heston, Secretary, Toledo, Ohio.

Union Springs & Northern.—An officer writes that this proposed line in Alabama is to run from Union Springs, via Fort Davis, Milsted and Rockford, to Birmingham, 116 miles. Eight miles between Union Springs and Fort Davis have been completed, and 74 miles from Fort Davis to Rockford have been surveyed. Grading will begin early in the summer. Wm. Blount, Union Springs, Ala., is President.

Velasco, Brazos & Northern.—Contract for the extension of this line from Anchor to Arcola, Texas, 20 miles, has been let to C. E. Coons. A connection will be made at Duke, Texas, with the Sugarland R. R., and the line will eventually be extended from Sugarland to Hempstead, 47 miles. J. H. Kempfer, Galveston, Texas, is President.

Wabash.—It is reported that contracts for building the branch of this road through Green County, Pa., will be awarded in April. Forty-five miles of single track, exclusive of sidings and small branches, are included in the project, besides several tunnels and one bridge.

Welland & Lake Erie.—Application will be made at the next session of the Dominion Parliament for an act to incorporate a company to build from Welland, Ont., southerly to Port Colborne, and thence in an easterly direction to Fort Erie, a total of about 30 miles. A. E. Pew, Welland, Ont., is said to be interested.

Whitehall & Granville.—This road, which was projected from Whitehall, N. Y., southeast to West Pawlet, Vt., about 20 miles, has been graded for a distance of nine miles out of Whitehall. The original contractors have failed and the company is now seeking new contractors. Chas. I. Barker, Troy, N. Y., is Secretary.

White River (Missouri Pacific).—An officer writes that the following lines are now building: From Buffalo City to Oregon Flats, 48 miles; from Carthage to Aurora, 38 miles. J. R. Reynolds, Mount Olive, Ark., contractor. Grading has been completed from Batesville Junction to Buffalo City, 82 miles, and track has been laid as far as Calico Rock, 54 miles. The proposed route covers a distance of 245 miles from Batesville, Ark., through Yellville to Carthage. There will be three tunnels and several important bridges, but contracts for these have not as yet been let.

Wichita, Oklahoma & Northwest.—Charter was granted this road on January 10, to build from Wichita Falls, Texas, northwest through Comanche, Kiowa and Greer Counties in Oklahoma, to Miami, Texas, a distance of about 200 miles. W. A. Stinson and F. H. White, Vernon, Texas, and J. H. Mounts and J. E. Schofield, Frederick, Okla. T., are interested.

GENERAL RAILROAD NEWS.

Buffalo, Rochester & Pittsburgh.—This company has declared a semi-annual dividend of 2½ per cent., which is an increase of 1 per cent. annually over the previous rate.

Illinois Central.—The Carbondale & Grand Tower Railroad, which had been worked for several years by the Illinois Central under a lease, has been sold to the latter company. The road runs from Carbondale to Girardeau, Mo., 35 miles, and between Carbondale and Johnston City, 15 miles.

Interborough Rapid Transit.—At a meeting of the voting trustees of this company on January 16, the lease of the Manhattan Railway Company was duly accepted. (See Manhattan Railway below, also our issue January 16, 1903, p. 56.)

Lake Shore & Michigan Southern.—This company has drawn its notes to the order of the New York Central for $25,000,000 in payment of half the Philadelphia & Reading stock, recently acquired jointly by it and by the Baltimore & Ohio. The notes are for one year, bearing 5 per cent. interest, and are placed chiefly with insurance companies in New York city.

Manhattan Railway (New York).—At a meeting of the stockholders of the Manhattan Railway on January 16, 1902, the lease of this company to the Interborough Rapid Transit was formally ratified. At a second meeting held the same day, it was decided, by a vote of 430,301 shares, or 90 per cent. of the capital stock, that the capital of the company be increased from $48,000,000 to $60,000,000; that 72,000 shares of the new stock be issued forthwith; that the remaining 48,000 shares be issued as required by the company, but not prior to January 1, 1906, provided the approval of the Railroad Commissioners be obtained for such issue; that the proceeds from the sale of the new stock be used for the completion of the improvements, now in progress, including the change of motive power. The 72,000 shares of additional stock of the Manhattan Railway Company will be offered for subscription to stockholders of record January 27, at par, at the rate of 15 per cent. of their holdings at that date.

Newark & Hackensack Traction.—E. W. Wakelee has been appointed receiver on petition of 72 per cent. of the bondholders, for failure to pay interest due on the bonds of said company July, 1902, and January, 1903. The securities are chiefly owned by the Hudson River Traction. A plan of reorganization is now being considered.

New York Central & Hudson River.—The Court of Appeals has recently handed down a decision favorable to this company with regard to the amount of capital stock to be taxed by the State Comptroller. The New York Central maintained that it was taxable on only $60,000,000 of capital, while the State Comptroller placed the amount at $104,000,000. The court decided that $86,000,000 of capital should be taxed.

Philadelphia & Reading.—See Lake Shore & Michigan Southern above.

Philadelphia & West Chester.—A mortgage to secure $600,000 4 per cent. bonds has been authorized by this company to retire the present $400,000 5 per cent. bonds now outstanding, and to provide for further improvements.

Seaboard Air Line.—The Birmingham & Atlantic has been purchased by this company, and will be operated as a part of the Birmingham division now being built between Atlanta and Birmingham by the Seaboard Air Line.

Shawnee & Red Fork.—Press reports state that this road has been sold to the St. Louis & San Francisco. It runs from Shawnee, Okla. T., to Red Fork, Ind. T., 75 miles, and is only partly completed.

Shelby.—A minority of the stockholders have begun suit at Louisville, Ky., to have the recent sale of this road to the Louisville & Nashville set aside. It was purchased last year for $150,000 and the plaintiffs claim that the property is worth $600,000. They also claim that no dividends were ever paid by the Louisville & Nashville, which operated this line under a lease previous to the purchase.

Wheeling & Lake Erie.—The annual report of this company for the fiscal year ending June 30, 1902, shows gross earnings of $3,537,023 in 1902, against $2,954,106 in 1901, an increase of $582,917. The operating expenses and taxes were $2,723,365 this year, an increase of $550,100 over 1901. The net earnings were $943,220, an increase of $21,570. The heavy expenditures for improvements and betterments caused a decrease in surplus of $74,827, leaving a total surplus of $427,627.